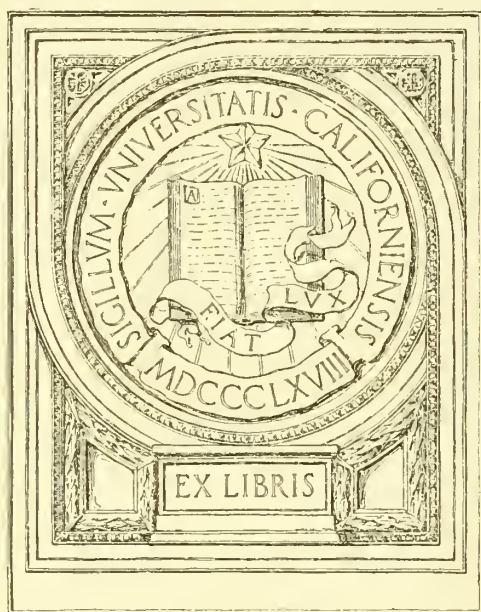


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COMPULSORY HEALTH INSURANCE*

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The President's address, in contrast to the papers presented on the regular programs and which are strictly scientific in character, very commonly deals with some topic concerning the policies or general welfare of the society or of the profession as a whole. This precedent I shall follow and the subject selected for consideration is that of Compulsory Health Insurance. I had wished to consider also some other aspects of the changing character of medical practice, but soon found that this subject alone was altogether too large to be more than hastily touched upon within the proper time limit.

That the problem of Compulsory Health Insurance has anything more than an academic interest for the members of this body would hardly be suspected, or perhaps even its existence known, from the perusal of the journals with which we are most familiar, or one the ultimate solution of which need give us any concern. But when it is known that legislative commissions for the study of the question have been appointed in at least nine of the states, that some of these commissions have reported favorably on the scheme, and that others have recommended it for further study, and when it is further realized that bills for its establishment have been introduced in no less than six state legislatures, it will be appreciated that some force is behind this sort of legislation even in the United States of America.

Voluntary sickness insurance has been in force in Europe for many years, and in certain trades even compulsory sickness and accident

insurance, but the first comprehensive law was that of the new German Empire passed in 1884, which has been amplified from time to time to include additional classes of workers, and to cover maternity, old age, and disability as well as accident and sickness. Bismarck, who was responsible for most of this legislation in Germany, stated that his idea was "to bribe the working classes, or if you like, to win them over to regard the State as a social institution, existing for their sake and interested in their welfare." He was alarmed at the time at the rapidly growing strength of the socialist party in Germany, and by this means aimed to snatch its weapons and use them in the interests of autocratic government. Whatever else this legislation may have accomplished, Bismarck's chief purpose was achieved if we may trust the soundness of the following quotation from "The Survey"—"The German Social Insurance, with its funds of billions, has largely been the source of astounding spiritual strength of Germany which surmounted even its defeat."

In England, compulsory sickness insurance was inaugurated by David Lloyd George, then Chancellor of the Exchequer, and enacted into law in 1911. In both Germany and England the voluntary societies long in existence were made the foundation for the new insurance structure, and soon lost most of their identity in the multiplicity of administrative officials and regulations from above. In both countries, a certain portion of the premium is deducted from the wages of the worker, about two-fifths, another portion is extracted from the employer, also about two-fifths, and the remainder is contributed by the state.

The United States, especially since the end of the World War, is in a much better economic condition than any other nation. Its people as a whole enjoy a higher standard of living than those of any other country, very much higher

*President's Address read before the Minnesota Academy of Medicine, St. Paul, September 14, 1921.

than most of them. It is, therefore, conceivable that a system of insurance that might prove advantageous in less favored countries might be wholly unnecessary, and in consequence undesirable in our own. If, on the other hand, the system were shown to yield unsatisfactory results in those countries, where, on account of small incomes and meagre savings, it should be most applicable, then it would seem to be doubly undesirable in our own.

The chief advantages claimed for compulsory health insurance are that it provides medical care for those who would otherwise be obliged to do without, while at the same time relieving them from the stigma of dependence upon charity; that it promotes thrift since the beneficiary must meet this charge regardless of other obligations.

As members of the medical profession we are of course interested in knowing what the effects might be upon the medical men who are drafted, for that is what it amounts to, to do this class of work. In Great Britain, before the act became operative, a so-called doctors' strike occurred, the men declaring they would never accept service under the panel. But when it became evident that some would accept service, large numbers hastened to sign up, fearing that they would otherwise lose much of the work they already had, since many, or, in some cases, most of their patients, would come under the provisions of the compulsory insurance act. Some of these men were already doing contract work for the voluntary insurance societies, of which there were many, and in some cases doing it for less per head per annum than the government offered under the insurance act.

Opinions as to the effect of the act in England differ. According to Alfred Cox, Secretary of the British Medical Society, the act is working satisfactorily, and the physicians working under it are satisfied, but there are other opinions of a contrary nature. The work in England is all done under the direction of the Ministry of Health with local committees, of which there are 200 in England, Scotland, and Wales. One of these committees consists of 60 persons of whom five are doctors. Besides these there are Medical Services Sub-com-

mittees, Panel Committees and Local Medical Committees, Allocation Committees, etc.

The rules and regulations determining the various procedures, the mode of settlement of disputes between doctors and patients, calculation of benefits, certificates, records, etc., required under the act make up a volume of five hundred pages. If it were possible in the time at my disposal, I would like to give you examples of the numerous certificates required of both doctor and patient to meet the requirements of the law in even the simplest case resulting in a temporary disability. The work of making out the various certificates or reports must in a large percentage of cases be much greater than that spent in the diagnosis and treatment of the condition. Nor is the clerical work ended when the doctor and the patient have done their part. The central officers must keep complete records of all cases and compute the benefits to which the patient is entitled. And the benefit, when computed, can be obtained by the patient only by following the prescribed rules and during prescribed hours on fixed days. The doctor's work becomes largely that of a clerk. Sufficient time for careful study and diagnosis and efficient treatment appear to be out of the question. In this connection I cannot refrain from quoting at some length from the personal experience of a well known American physician, Dr. Emil Ries, of Chicago, with this kind of work in Germany. Dr. Ries took the practice for a month of one of the state physicians, located in Berlin, while the latter was away on vacation. Here is what he says:

"When I became acquainted with the doctor he showed me the office, which was the living room of the family; the best room of the family served as waiting room. There was a little hall (dark as most halls in Berlin) where a man admitted the patients. There were office hours in the morning from eight to ten, and often we had to start at seven in order to get through. After ten, the calls were made at the homes. In the afternoon from two to four there were office hours, and then more calls, and in the evening from eight o'clock on, office hours again.

"I had to see between 30 and 40 patients

from eight to ten. If I saw 30 patients in 120 minutes that gave each patient exactly four minutes. Figure it any way you want. You might give one ten minutes, then you can't give the next one four. Now maybe some of you have consulted physicians who made a thorough examination and you probably remember that it took more than four minutes. How closely could those patients be examined? They could not be examined. There was a very ingenious arrangement by which the doctor took care of that practice. In front of him on the desk was a set of pigeon holes with prescriptions in them. Mrs. Doctor used to write these prescriptions while he was out making calls. These prescriptions were ready—stacks of them. When the man came in at the door he was asked 'What is the matter?' He would say he had a cough. The doctor reached in and pulled out a prescription for cough, 'Here, a teaspoonful three times a day. Next.'

'The next one had a headache. 'Powder, twice a day, morning and evening. Come back tomorrow.' That is the way it was done—not only in that office but in every office of the doctors working under the Health Insurance office. I watched him for a few days before he left, as I wanted to learn the tricks, and I said, 'How do you manage with the people who have some real trouble, not simply fancy a headache or a little bit of a cough that doesn't matter?' 'Oh,' he said, 'that is very simple; they come back. The others get one prescription; they are all right. Maybe they come back for another prescription after two or three days. Most of them get well, anyway. They would not come if it cost them something. They only come because it doesn't cost anything.'

'Well, what about the man's working efficiency?' 'Oh, well, they have to pay him while he is not working, therefore, he lies off as long as he can. As long as he has a prescription from the doctor he is sick and he lies off two or three or four days of a week. That insurance pays for it; not only buys his medicine, but pays him a part of his wages.'

'Now, what do you do with the man who is really sick?' 'I put him aside and when I am through with the mob I take that man in the corner and look him over.' I watched him

to see how many he looked over. He had just exactly one to look over. That man was sick enough, to be certain.

'The next was: 'How do you make your calls; how many calls do you have to make?' 'Oh, I make ten or fifteen calls in the morning, twenty calls in the afternoon.' 'Take a cab?' 'No, you can't take a cab. Those people are all social democrats. If you arrive in a cab they call you a plutocrat and won't have anything to do with you. You walk.' So to get around in Berlin from the doctor's office I took a car for the farthest call, as far away as I had to go that day, and then walked back towards the office, making all calls in that direction, and did that in various directions, and every time I came to the office I picked up some more calls.

'How do you do at the homes?' 'Same thing. Give them a prescription, that is all they want.' 'Well, now, if they are really sick, what do you do?' 'Well, send them to the hospital; don't bother with them, it doesn't pay.' It doesn't pay, that was the most important thing.

'Well I saw 30 people in the office in the morning. I saw 10 or 15 at calls in the morning. I saw 10 or maybe more in the afternoon. I made 15 to 20 calls in the evening and I had to see 20 to 30 again in the office in the evening. I was so dead tired when I was through that I could not even read a newspaper, and as for reading up on interesting cases it was utterly out of the question.

'I said to the man, 'How can you live that way? You are nothing but a slave. You might just as well sell pants or nail boxes. There is no more intellectual effort to this kind of business than there is to the most ordinary working man's life.' 'Well,' he said, 'I know it. I am going down. I haven't any brains any more. I haven't the energy any more to read anything. I haven't the time to go to a medical meeting because if I go I lose my calls; if I lose my calls, I don't make a living.'

'I began to get interested in how much he made and I found out. For an office call, six and a quarter cents (pre-war exchange, not present exchange). That was long before the war. For a call at the residence, 12½ cents.

Do you wonder now why he had to make 30 examinations in the office? Thirty times 6 cents is \$1.80. What kind of service did he give those patients? Was that service worth any more than six cents? Did that patient get what he paid for? He paid nothing and he got nothing.

"Four years later the state doctor spent six months in a sanitarium for a nervous breakdown, and in two years more he was dead."

Such an experience reads like comedy, but unfortunately it is not comedy, but tragedy. It represents the manner in which state medicine is practiced not only in Germany, but in Britain as well, and a study of the experience lays bare most of the basic defects of the whole scheme. If the results are half as bad as this account would indicate, then either there is nothing in the healing art or this is a gross travesty upon it. It represents a tremendous machine turning out an insignificant product of the poorest quality. And in England they are finding out that the machine is expensive to run.

The per capita cost of administration alone under compulsory insurance run by the state now exceeds the total cost under some of the old voluntary societies. Bad as we consider this class of contract work, the old system had at least the merit of devoting its funds, not to the running of a complicated administrative machine, but to paying for medical services and no physician could hope to retain his job unless his services were satisfactory to the society he served.

But the mounting cost of administration is by no means the most serious defect of the system. So far as the medical profession is concerned the effect is deadly. The incentive and opportunity to improve one's self and one's condition, which to my mind are fundamental to the success of any human endeavor, are almost wholly removed, with the result that the panel physician becomes little more than an automaton going through a monotonous heart breaking daily grind, and activated chiefly by the strings manipulated by the dictator from above. It is a fortunate thing for the science and art of medicine that not all the people of Britain come under the provisions of the com-

pulsory insurance act, and that in consequence a part of the medical men are left free to practice their profession on their own merits. These may do something toward sustaining the traditions and aspirations of the profession, but one or two generations will be required to show all the evil effects of the system. In Germany, where a high percentage of the people come under compulsory insurance, we are told by E. H. Ochsner, who is an authority on the subject, that the brightest young men are no longer attracted to the study of medicine, and to this fact he ascribes the loss by the German speaking peoples of the leadership in the profession which they so long and deservedly held. Of necessity it is not the profession alone which loses, but ultimately the whole populace which it serves.

According to Hoffman "regardless of positive assurance to the contrary, the panel system is not satisfactory to a large proportion of panel patients. Not only are many of the most frequent and serious diseases excluded from care under the law but many of the insured prefer to secure physicians at their own expense." And since they have a choice of physicians serving on the panel it is apparently the system that destroys the physician's efficiency. An officer of one of the Fraternal Societies says that "it appears to him that the medical service under National Health Insurance has degenerated into a most miserable service." "The attitude which it seems is required of the Society must be to doubt every medical certificate and every claimant for sick pay." Worse still, Hoffman quotes "There is an entire lack of that fraternal spirit which formerly permeated the Friendly (i.e. the Voluntary) Societies." "Instead of broadening the spirit of mutual aid, there prevails now a more contracted and suspicious point of view, emphasized in countless rules and regulations, and a large paid advisory staff, to safeguard the State against malingering and frauds."

As might be expected under such a system a study of the statistics shows that there has been a gradual increase in the average number of days of sickness for which treatment and benefits are claimed under state insurance. It is only human nature to attempt to get as much

as possible for nothing or for a minimum fixed sum. We have sufficient examples of that right at home.

Instead of promoting thrift on the part of the individual as has been contended the result has been the opposite. Insured persons have assumed that whatever might arise, the state would take care of them and have spent everything they made in a reckless and indiscriminate manner. There is a very different story in this country where, as the result of individual and voluntary effort, there is each year an increase in savings bank deposits and in insurance, both ordinary and fraternal. In the words of President Hadley, of Yale, "We need measures which shall increase individual responsibility rather than diminish it; measures which shall give us more self-reliance and less reliance on society as a whole. We cannot afford to countenance a system of morals or law which justifies an individual in looking to the community rather than to himself for support in age or infirmity."

One of the most serious aspects of the whole proposition, and the one that is likely at first to be entirely overlooked is the great increase in the number of government employes. We have had this danger brought home to us in the United States since the close of the war, but it is doubtful if many realize what a veritable army of men and women derive their living from government jobs, in other words from the money the rest of us pay in the form of taxes. But if one stops to consider the multitude employed in the various departments of municipal, county, state and federal governments, with all their officials, bureaus, commissions, boards and inspectors, not forgetting income tax and prohibition enforcement agents, each provided with a coterie of clerks and stenographers, he is prepared to believe Irving T. Bush when he says that even leaving out of account the army and navy every ten workers in the country must support one public employe.

The tendency of government today is to regulate everybody's business and that tendency is growing in spite of the disastrous experience of the past. Can anyone point to anything that the Government has ever done in an efficient and economical manner? The conduct of

the post-office department is always pointed to as the one shining exception and yet it will be remembered that some years ago John Wanamaker offered to pay many millions of dollars for the monopoly of the post-office business to be conducted at prevailing government rates.

To my mind government is a necessary evil, and its functions should be limited to those that cannot be otherwise exercised. Recent years have shown an alarming tendency to delegate the duties of the three chief departments of government, executive, legislative and judicial, to so-called commissions, which in consequence are clothed with well-nigh autocratic authority, and, with their hosts of political employes, not only withdraw great numbers from the useful field of production, but add them to the armies of government dependents with the inevitable accompaniment of inefficiency, increased taxes and graft. I do not wish to see added in this country a department or commission taking charge of the healing of the sick and running it as a political appendage of the party in power, and this is certainly what would happen.

And finally, the question arises, whence comes all this agitation for this class of legislation. Notwithstanding the wholly unauthorized statement of a recent president of the American Medical Association that "the next great step in advance would be state medicine," I am convinced that the medical profession will be found absolutely opposed to it just as it was in England and as I believe it to be in Germany. No man can wish to see his profession debauched and himself reduced to the status of a clerk if not of a charlatan.

The next class most concerned is the employers, and these, great and small, have voiced only one sentiment, that of opposition. And, wonderful to relate, the very class which is supposed to benefit by this new brand of paternalism, the worker himself, has recorded his opposition to its introduction. The American Federation of Labor as a body, and Samuel Gompers, its time honored president, have both recorded in unequivocal terms their disapproval.

If the only class that it proposes to benefit declines to be benefitted and the scheme is re-

pugnant to all others immediately concerned, who then is for it? I believe the answer is not far to seek. First, there are the socialists who are blind to the lessons of current history and welcome each step leading toward their impossible ideal; second, those politicians who, like Louis XV, are willing to sacrifice the future of their country to their own present comfort and advantage. Bismarck, as has been stated, frankly admitted his motive in introducing the system into Germany, and my own conviction is that, in forcing it upon the people and the medical profession of Great Britain the motive was more political than humanitarian on the part of the shiftily gentleman responsible. If not, his subsequent record shows a deplorable lapse in virtue. And, lastly, there is, in every community, a class of worthy sentimentalists, who, ignoring the inflexible laws of cause and effect, and the limitations set by nature upon every human being, are prepared to reduce all to a dead level, not of opportunity alone, but of condition as well. Their business is "uplifting" and humanity must submit, willing or not. Incidentally it is getting to be a reasonably easy and profitable calling and forms a no mean political potentiality capable of being united with the other governmental employes in seeing that nobody loses his job. Let the process continue and we shall eventually be in the position of the people of the village in which each family lived by taking in the washing of its neighbor.

To conclude: Compulsory health insurance, in its origin is more political than humanitarian; it does not accomplish that which it undertakes, in England, at least, excluding from its provisions many of the most frequent and burdensome illnesses; the service which it renders is mechanical and devoid of the humanizing element; instead of promoting thrift on the part of the insured, it has the opposite effect; it adds greatly to the total expense involved in the field it aims to cover; it creates a great number of new jobs and large funds taken from the public and the wage earners and both subject to the manipulations of the politicians; if sufficiently expanded it will eventually destroy the medical profession, transforming its members into overworked auto-

mata, engaged chiefly in rushing from place to place and the performance of clerical work. Where already introduced it has been the forerunner of compulsory accident, maternity, old age and unemployment insurance, the last named the most pernicious and socialistic of all.

It behooves us as physicians and citizens to do our part in seeing that the general public understands the real facts so that when the time for action comes, the outcome will not be determined by ignorance, sentimentalism or the immediate needs of unscrupulous politicians.

JAUNDICE FROM PANCREATIC DISEASE*

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In considering jaundice due to pancreatic disease the cases of so-called hemolytic jaundice caused by blood cell pigment stain, a chronic condition in which the spleen is a factor, and the large per cent of the cases of jaundice in which the gallbladder is small and there are stones in the common duct, so well described by Courvoisier, are eliminated at once, even though the pancreas may be secondarily involved. Facts relating to the mechanics of jaundice may be stated briefly. Bile is formed in the liver and should pass freely through the hepatic duct and the common duct into the intestine. The common and hepatic ducts are joined at their juncture by the cystic duct from the gallbladder, an added reservoir, which normally contains about one ounce, although it is capable of distention, should occasion require, to a capacity of several ounces. Just why man and some animals have gallbladders and others do not is problematic since the exact function of the organ is not yet known. Part of its function evidently is to maintain the stability of tension in the ducts under which the liver secretes bile and protects itself by the exudate of mucus from its lining. Experimentally, bile from the hepatic duct injected into the pancreatic duct is more irritating than bile from the gallbladder.

In nature no duct delivers directly into a

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to pancreatic disease as certain characteristics of pain from pancreatic colic are noted in the absence of the gallbladder and without obstruction to the flow of bile. Inflammation of the pancreas may occur with dull pain more or less constant in the region of the pancreas usually attributed to the stomach; the pain is deep, extending to the spine; it may be to the right of the midline in the region of the gallbladder, as well as to the left in the region of the body and tail of the pancreas. With pain may occur an intermittent diarrhea and loss of weight, followed later by jaundice, or jaundice may appear early in a rapidly progressing case; it is probable that in such cases the common duct deeply grooves the pancreas, favoring early obstruction. Such variations of symptoms are noted with cancer of the pancreas.

A large cystic gallbladder with the stone blocking the cystic duct and protruding through and blocking the common duct is a rare but possible finding on exploration, and is one of the few exceptions (Courvoisier) from the usual small gallbladder noted in cases of common duct stone. The result of obstruction of the common duct from the pancreas, aside from jaundice, is pain, indigestion, loss of weight and strength, and occasionally diabetes. The stools are light colored from lack of bile or from the presence of an excess of undigested fats. Chills and fever are not the rule as with infection and gallstones. Physical examination in the early or acute condition usually reveals but little; later an indefinite sense of a deep tumor mass may be felt and often a round tumor to the right of the midline is noted which is probably the distended gallbladder; the liver is enlarged and, if irregular and lumpy, is probably involved by metastasis.

Cancer of the pancreas is usually not rapid in its progress; it extends over many months, and in the early stage jaundice may vary in

intensity as bile passes through the duct from time to time.

In milder cases of chronic pancreatitis there is some difference of opinion as to whether the gallbladder should be removed or drained for a long period. Mann's research work shows that removal of the gallbladder greatly lowers the tension within the duct, reducing the spastic closure of the sphincter of Oddi. External drainage of the gallbladder for a period of many weeks may be justified in certain inflammatory conditions of the pancreas. These conditions but rarely cause jaundice for more than a brief period and of mild degree. However, admitting the difficulty of diagnosis, the greatly distended gallbladder with jaundice in middle or old age is more probably associated with malignant disease of the pancreas and many of the symptoms of discomfort are due to the jaundice, the itching, the blood changes, and the loss of bile from the alimentary tract. In such cases cholecystoduodenostomy or cholecystogastrostomy, according to the ease and safety in which either may be made, the former generally being preferable, short-circuits the delivery of bile, gives great relief, and undoubtedly prolongs life. The operation is not advised at a time when hemorrhagic ecchymosis from intense jaundice is noted over the body. Some patients with greatly delayed coagulation time of the blood require special preparation and calcium treatment for a prolonged period, and possibly blood transfusions before and after operation in order to control the serious complication of bleeding which may even occur from the nose and mucous membrane of the alimentary tract. The fistulous opening remains patent only when the obstruction of the common duct is complete and permanent. The relief is most marked in inflammatory disease, and yet life is greatly prolonged and rendered more comfortable in cases of cancer of the pancreas.

X-RAY DIAGNOSIS OF GASTRO-INTESTINAL DISEASES*

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The modern methods of diagnosis in diseases of the gastro-intestinal tract incorporates three main avenues of approach, namely: (1) History, (2) X-ray, (3) Laboratory, whose relative rank of importance may be considered as above enumerated.

The writer does not purpose to foster anything new, but simply to give a resume of present ideas and standards from an x-ray standpoint on this important subject, which has within recent years become a real entity. This is in a large measure due to the manufacture and sale of apparatus for this use, which is dependable and efficient, thanks to manufacturer, electrical engineers and physicists, the latter being represented by such men as Dr. Coolidge of Coolidge tube fame. The usual method of study is by fluoroscopy and radiography combined, as only then can the constant changes in outline which occur with peristalsis, be properly interpreted into a consummate picture. A radiographic exposure, or even several, may show definite filling defects suggestive of pathology, whereas one moment during a screening examination under palpation may produce a normal filling, and thus rule out any such suspected evidence. The radiographic method is necessary to show up constant filling defects and areas of peristaltic absence, with more conclusiveness than the eye can detect them on the screen. Furthermore, a radiograph serves as a record for comparison in future study and observation of the same case.

The *modus operandi* consists of introducing an insoluble metallic salt into the alimentary tract by means of suitable suspension media, which according to Pfeffer¹ was first introduced by Professor Bowditch² of Harvard in May 1897. The axiom that elements obstruct the passage of x-ray according to their density and atomic weight holds true for the popular use of bismuth and barium compounds in this work, by

producing shadows on fluoroscopic screens and x-ray plates, conforming in outline to the alimentary tract in contrast to surrounding organs and tissues.

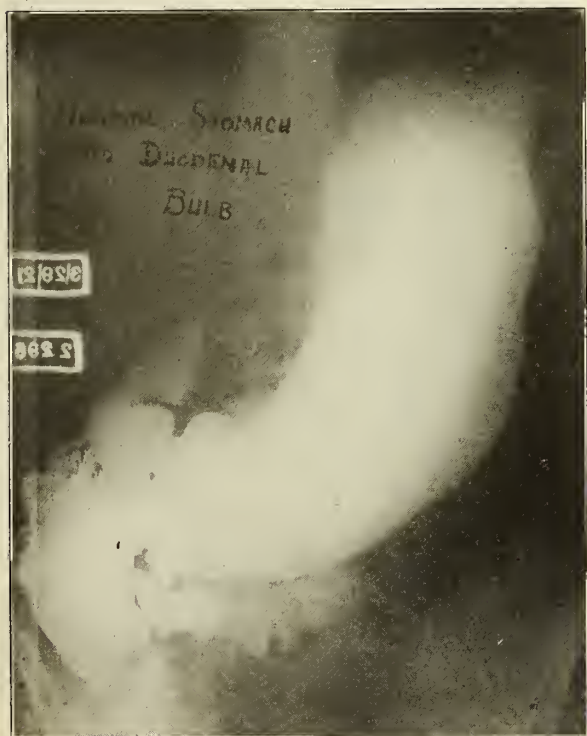
The routine of examination usually practiced, which was introduced by Haudek and modified by Carman³, is to furnish the patient in lieu of breakfast a barium meal consisting of about 100 gms. of barium sulphate which he or she is instructed to take in oatmeal or cream of wheat with milk and sugar as desired. This barium is usually furnished on the day previous to the examination with instruction to take at a specific time and to return to the laboratory in six hours, when fluoroscopic and radiographic observations are made consecutively. This is called a double meal test as it serves to obtain: (1) The six hour observation for residue in the stomach, (2) The noting of motility, or location of the head of the barium column, (3) Stomach and duodenal filling and outline; thus combining two examinations and saving one trip to the laboratory. A short resume of the patient's clinical history is always recorded before starting the screening examination to better anticipate what to look for as well as to help make the final interpretation of the shadows present. One should not be too hasty at conclusions, but rather cautious and conservative in the interpretation of what can be seen and demonstrated on the screen and plate. W. J. Mayo⁴ has stated that only one person in ten complaining of gastric symptoms has a gastric lesion, which does not mean that the remaining 90 per cent are to be classed as neuropaths, or malingerers, as there are numerous extrinsic pathological conditions which may produce gastro-intestinal symptoms, and the roentgenologist should be able to detect them when present and thus help to bring about a true diagnosis. The thorax should always be routinely fluoroscoped before the topic at hand, and the radiographs should be studied for evidence of biliary tract, genito-urinary and bone lesions. Newcomb⁵ states that hypertrophic bone changes in the spine may produce the whole gamut of signs and symptoms so generally known in cases of so-called indigestion.

The x-ray has taught us that stomach form

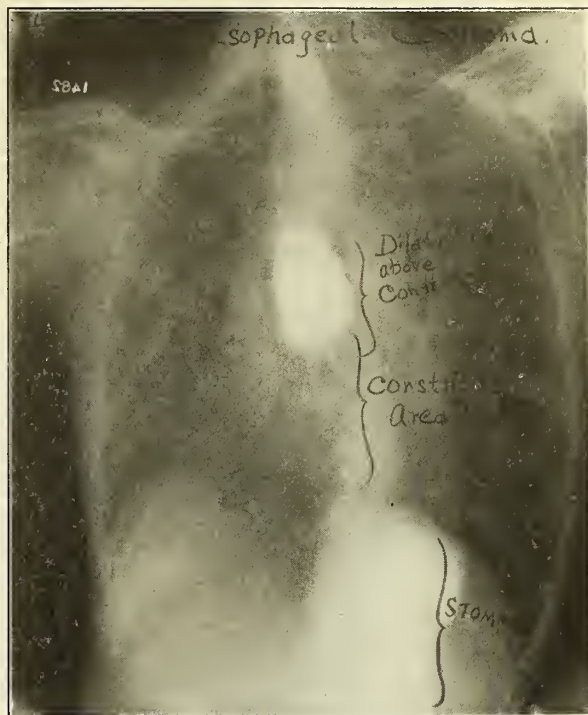
*Presented before the Southern Minnesota Medical Association, Winona, Minn., June 1921.

can be variable but normal; for instance, the tall, slim individual may have a stomach which is long and acutely flexed at the distal portion, otherwise known as a fish hook type, whereas, the stout, stocky individual may have a stomach which is more transverse, lying high and known as a steer-horn type. The names are simply descriptive of the shape of these organs and may reach from one extreme to the other. The anatomical landmarks which are routinely observed in gastro-intestinal work are: (1) The esophagus, its contour and peristalsis; (2) The stomach, its pars cardiaca, pars media, pars pylorica, the incisura cardiaca, the incisura angularis, the gas bubble, the pylorus; (3) The duodenum—the bulb, the second and third portion; (4) The appendix in 24, 48 and 72 hours periods; (5) The colon, immediately by injection or at the 24, 48 and 72 hour periods following the barium meal. In examination of the colon we note and observe the cecum, the hepatic flexure, the transverse colon, the splenic flexure, the descending colon, the sigmoid and rectum.

Carman classifies x-ray findings into two groups, direct and indirect. The direct mean a filling defect and are pathognomonic; they show as extrusion, such as a niche or accessory pocket.



1. Normal stomach and duodenal bulb.



2. Esophageal carcinoma showing dilatation above constriction with barium residue.

or may show as intrusion of the lumen of the gut. The latter or indirect findings are known as follows: (1) Abnormal spasticity, (2) Altered peristalsis and motility, (3) Tone interference, (4) Abnormal mobility and flexibility, (5) Presence of localized tenderness. In absence of direct findings the indirect are at times so pronounced that a justifiable diagnosis can be made by them alone.

NORMAL STOMACH

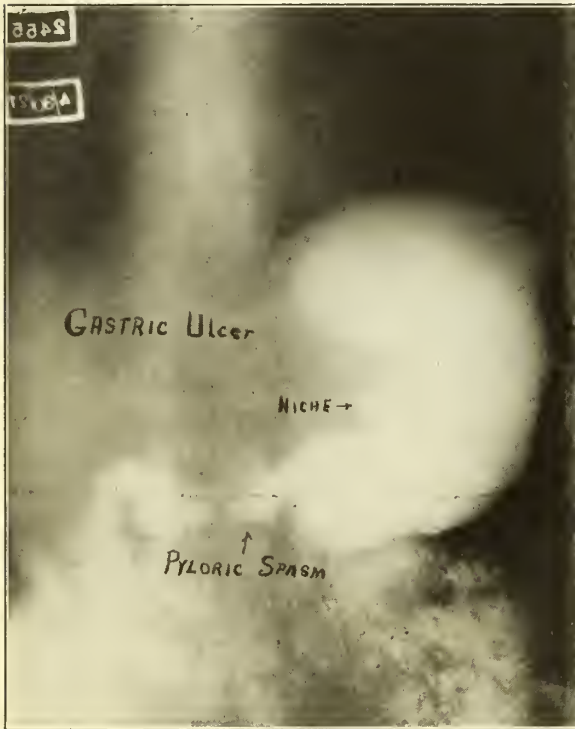
A normal stomach from an x-ray standpoint should present as follows:

1. Motility, showing complete clearance of the barium meal within six hours.
2. Form, usually of fish hook type, occasionally steer horn in the stout, robust individual, or some intermediate grade.
3. Orthotonic, that is, it assumes a vertical form even under moderate distention.
4. Contour, showing sharp outlines with presence of peristaltic waves, the presence of the incisura angularis and the incisura cardiaca.
5. Size, normally should hold without particular over-distention from 20 to 24 fluid ounces.
6. Position, varies as the lower border may lie considerably above or below the navel.
7. Mobility, should be present to palpation.

8. Flexibility, that is, it should indent by the pressure of fingers.

9. Peristalsis should always be present and show anywhere from one to three waves at one time; whereas more than this should be considered in the nature of a hyperperistalsis.

The chief gastric, duodenal and appendiceal pathologies may be briefly summarized as follows:



3. Gastric ulcer showing niche on lesser curvature. Note pyloric spasm as an indirect sign.

GASTRIC ULCER

I. Direct Findings:

1. Niche, or barium-filled crater of a penetrating ulcer.
2. Accessory pocket, or so-called diverticulum (the cavity of a superficial ulcer.)
3. Organic hour glass stomach.

II. Indirect Findings:

1. Spastic manifestations;
 - a. incisura,
 - b. spasmodic hour-glass stomach,
 - c. diffuse gastric spasm.
2. Retention from the six hour meal.
3. Abnormal peristalsis.
4. Gastric hypotonus.
5. Acute fish hook type of stomach.



4. Perforated gastric ulcer on lesser curvature, showing diverticulum with barium residue.

6. Lessened mobility of stomach.
7. Localized tenderness.



5. Hour-glass stomach. This case had a gastro-enterostomy performed seven years ago and gives a plus-Wassermann reaction.



6. Gastric carcinoma involving greater curvature of pars cardiaca.

In the presence of hour glass stomach or incisura the tincture of belladonna, 20 minims t. i. d., is given until a dilated pupil with dryness of the throat results. This is given for the purpose of ruling out spasms and thus determining whether or not the lesion is intrinsic or extrinsic.

GASTRIC CARCINOMA

I. Direct Findings:

1. Filling defects.

II. Indirect Findings:

1. Abnormality of pyloric function;
 - a. gaping of the pylorus,
 - b. obstruction of the pylorus.
2. Abnormal peristalsis;
 - a. absence of peristaltic waves from involved areas,
 - b. weak peristalsis,
 - c. violent peristalsis,
 - d. anti-peristalsis,
 - e. irregular peristalsis.
3. Abnormal motility;
 - a. rapid emptying (non-obstructive case),
 - b. delayed emptying (obstructive case),
4. Lessened flexibility.
5. Lessened mobility.

6. Abnormal size or capacity;
 - a. shrinking,
 - b. dilatation.
7. Persistent local spasm.
8. Displacement.

DUODENAL ULCER

I. Direct Findings:

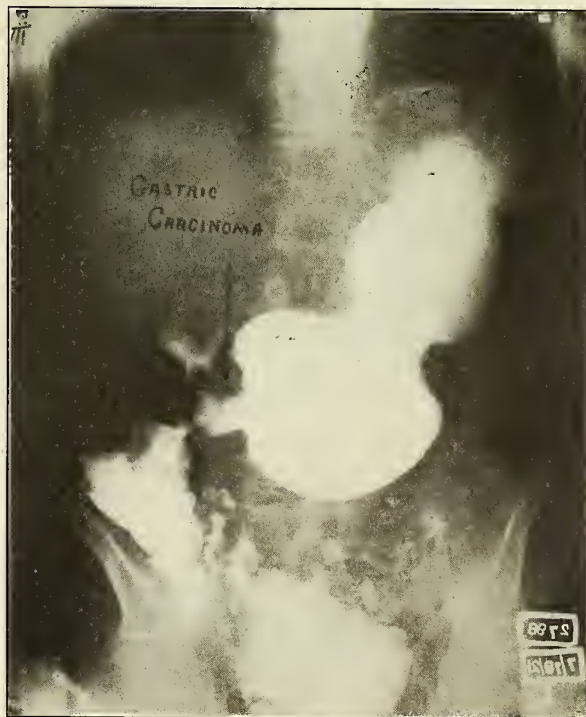
1. Deformity of the duodenal bulb,
2. Diverticulum.

II. Indirect Findings:

1. Gastric hyperperistalsis,
2. Gastric retention from the six-hour meal (the combination of hyperperistalsis with the retention and hypermotility is especially significant of duodenal ulcer).
3. Hypermotility.
4. Gastric hypotonus in the non-obstructive form.
5. Gastric hypotonus with dilatation of the antrum and pouching, seen in old obstructive cases.
6. Gastric spasm, such as spastic hour glass, or transient incisura.
7. Localized tenderness to pressure over the duodenum.

PATHOLOGICAL APPENDIX

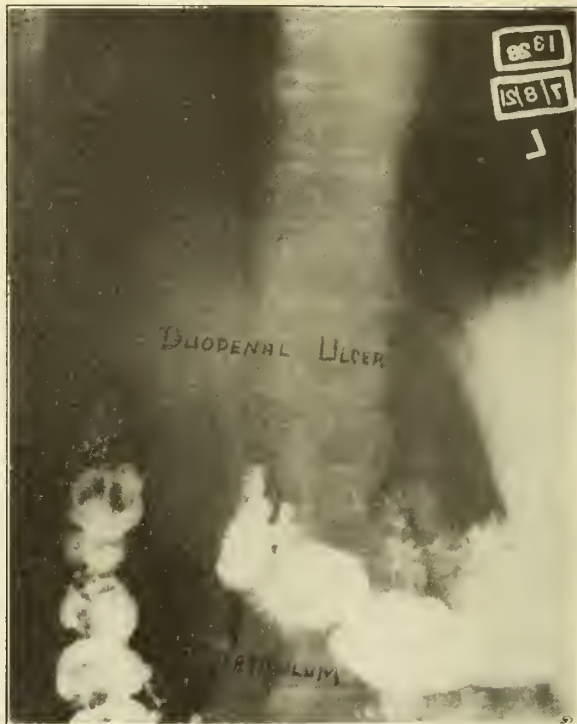
1. Visibility (Skinner^e states that the appendix normally is visualized up to the age of



7. Gastric carcinoma involving pars pyloric showing a symmetrical narrowing of the pylorus.



8. Duodenal ulcer showing an irregular bulb as well as hyperperistalsis and hypermotility, the barium head having reached the sigmoid in six hours.



10. Duodenal ulcer showing branch deformity of the bulb together with a diverticulum, which showed waving fluid under palpation during fluoroscopy.



9. Duodenal ulcer, obstructive type, showing markedly enlarged stomach due to gradual distention. The duodenal bulb could not be visualized.



11. Gall stones with hypermotility, the barium head being in descending colon in six hours.



12. Carcinoma of the colon showing almost complete obstruction directly beneath the splenic flexure. This plate was taken 30 hours following a barium meal.

thirty and when noted past this age period it should be considered indicative of chronic disease);

- a. regularity or irregularity of lumen,
 - b. movability or fixation,
 - c. presence of kinks.
 - d. tenderness to pressure.
2. Fixation and tenderness over the terminal ileum (Eastmond⁷ states that in pathological appendix the terminal ileum is adherent and fails to hold barium evenly. Previous incidence of typhoidal infection must be ruled out.
 3. Cecum;
 - a. dilatation,
 - b. fixed or freely movable,
 - c. tenderness to pressure.
 4. Relative ileal stasis, (Alvarez⁸ states that the gradient or stimulated anti-peristalsis of the terminal ileum in cecal pathology can produce ileal stasis).
 5. Presence or absence of gastric residue in six hours.
 6. Presence or absence of hypermotility.

CONCLUSIONS

1. X-ray diagnosis in diseases of the gastro-intestinal tract is efficient and reliable.

2. Resumes of the clinical history should always be associated in making final diagnosis.

3. Preliminary examination of the chest before screening of the abdomen should be made to rule out pathological thorax.

4. Extrinsic pathology such as genito-urinary, gall bladder and bone lesions must always be considered when present and associated with symptoms of so-called indigestion.

5. Variation in stomach position and tone are factors which may influence the pathology present.

6. Anatomical gastro-intestinal landmarks should be noted in all examinations.

7. X-ray findings are divided into two groups, namely—direct and indirect.

8. Routine daily examinations until colon is empty is good technique.



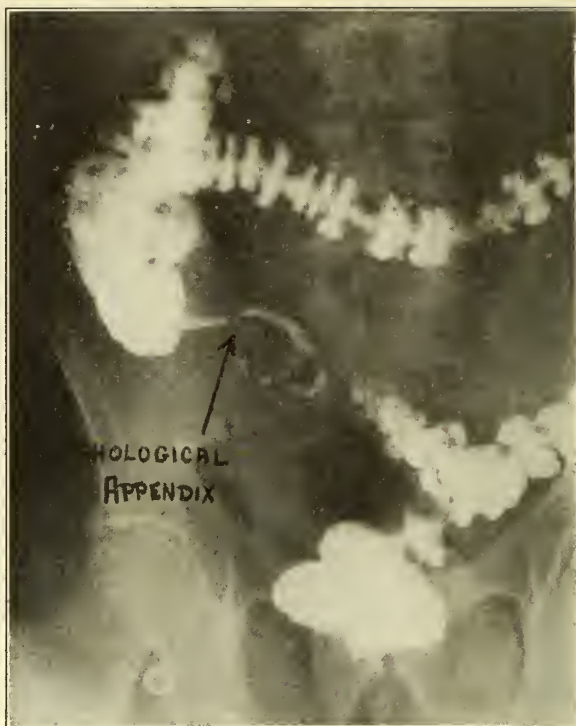
13. Carcinoma of the sigmoid.

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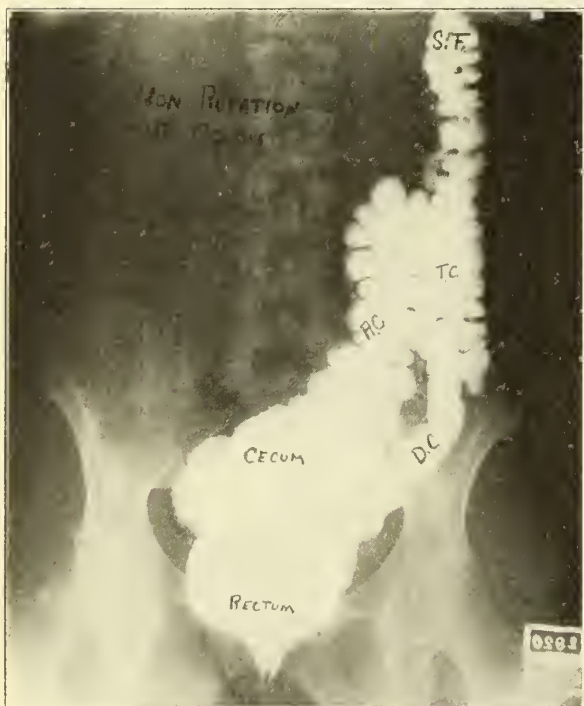
1. Pfeffer: The Journal of Radiology Vol. 11 No. 3, April, Page 41.
2. Bowditch: Science, June 11, 1897, Page 901.
3. Carman: The Roentgen Diagnosis of Diseases of The Alimentary Canal, Second Edition, Page 29.
4. Carman: The Roentgen Diagnosis of Diseases of The Alimentary Canal, Second Edition, Page 38.
5. Newcomet: Arthritic Changes in The Spine. Their Relation to The Roentgenologic Study of



14. Colitis of two years duration involving descending colon and sigmoid showing absence of haustration as well as narrowing of the lumen of gut.



16. Pathological appendix, showing segmentation. The appendix was fixed and tender to palpation. Subject was a male, age 45, with long standing gastro-intestinal symptoms.



15. Non-rotation of colon, cecum, ascending colon (A. C.) transverse colon (T.C.) descending colon (D. C.) all on the left side.

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DISCUSSION

DR. A. B. MCORE, Rochester: I have enjoyed Dr. Nessa's paper very much; he has covered the territory thoroughly and all that I can do is to further emphasize some of the most important points.

I think that one of the strongest features of his paper is his emphasis of the principle that the roentgen examination is but one link in the chain of evidence in gastro-intestinal diagnosis; this is a point on which too great emphasis can not be placed.

The technic described by Dr. Nessa is the one which we employ at the Mayo Clinic, namely; the six-hour motor-meal as a test for gastric retention; careful fluoroscopic examination of the stomach and duodenum after the ingestion of an aqueous solution of barium in search of filling defects and deform-

ities of these viscera; and the making of two or more roentgenographs as further evidence.

The most common of the lesions of the stomach to be frequently overlooked probably are those situated at or near the cardia. Many of these may be discovered by carefully watching the liquid solution as it enters the stomach, angulations and distortions of the lower end of the esophagus being valuable indices of a lesion at the cardia.

Careful and thorough palpation of the stomach and duodenum under the fluorescent screen is essential as only by this method may lesions of the posterior wall be discovered.

As Dr. Nessa has stated the diagnosis of duodenal ulcer is based largely on cap-deformity, although the value of hyperperistalsis and six-hour retention must not be overlooked. Cap-deformity is chiefly due to a spasmodic contraction, distinct craters being uncommon in ulcers of the duodenum. While adhesions may deform the duodenal cap, thereby simulating the deformity due to an ulcer, in our experience this is rare. In doubtful cases we have found that a second roentgen examination after the administration of belladonna is a valuable method of excluding deformities due to some reflex spasm.

At the present time we feel that the roentgen examination of the gall-bladder is of little value, the evidence being indirect and indefinite.

Authorities differ materially in their opinions as to what constitutes the roentgen evidence of appendicitis. Personally I feel that, aside from demonstrating abnormal locations of the appendix, the roentgen rays contribute little information that can not be obtained by other methods of examination.

DR. F. S. BISSELL, Minneapolis: The essayist and Dr. Moore have so thoroughly covered the field that there is very little left for me to say. I would like, however, to devote the first part of my discussion to that type of case which the roentgenologist meets quite frequently, in which there is a definite ulcer history, more or less typical, and in which no evidence is found on intragastric examination. That, to me, has been one of the daily problems met in gastro-intestinal x-ray work. Doubtless we have to consider a certain number of ulcers which give no roentgen signs. To study this problem in terms of percentage would be impossible because the surgeon very properly does not open many of these stomachs. That there are ulcers which do not produce the slightest niche or which give no indirect signs is difficult to prove. Then again, there are extrinsic conditions which give pretty good ulcer histories. Among these, I think a fair percentage are in the upper right quadrant, gall-bladder cases. Perhaps we are a little derelict in our duty in not laying enough emphasis on the study of the gall-

bladder region in gastric cases. I believe if we study thoroughly and carefully all cases that come through our hands, we would be able to diagnose very many more cases than we have in the past. This "neglect to try" is a source of frequent error. We feel that because we are not able to demonstrate gall-stones in a number of instances, there is no need of following these cases through. Dr. Nessa has brought out, and Dr. Moore has emphasized the importance of history in the study of these cases. I see no reason why the roentgenologist should ignore the history of a case any more than the internist or pathologist should ignore it. A pathologist must have a history of a case before he will study the specimen, and it is important that the roentgenologist should have a history of the case and proceed with his diagnosis as an internist or any other diagnostician would proceed, that is, by exclusion. If we have a definite case history and proceed in that way, very often we can arrive at a diagnosis based upon objective roentgen evidence which might have escaped detection.

I was surprised to hear Dr. Moore's statement that he attaches very little importance to duodenal cap deformities due to gall-bladder involvement. Whether they are due to spasm or adhesions it is difficult to say, but certainly it is not an uncommon thing to have cap deformities which are not typical of ulcers and which are undoubtedly caused by gall-bladder disease. I confess that I have seen cases, such as Dr. Moore describes, with the duodenum surrounded by gall-bladder adhesions, where the duodenum appeared perfectly normal on the screen or plate, but where one comes across one such case as that, there are many cases which show a definite cap deformity due to gall-bladder disease.

With reference to the appendix, I have been through the same gamut of optimism and pessimism, and I must confess I know as little about it as I did several years ago.

I cannot agree with the essayist that all cases beyond 30 years of age which do not fill are pathologic; neither can I agree, as far as my observation goes, with the statement made by Dr. George in his textbook that any normal appendix will fill. It seems to me, there is no definite rule to follow. If we have an appendix which fills and remains filled after the rest of the intestinal tract is emptied, and an adherent tip, we are justified in making a diagnosis. It is one thing to make a diagnosis of a pathological appendix a safe diagnosis since the pathologist will always confirm it; and quite another to make a diagnosis of appendicitis, meaning that if that appendix is removed, the patient's symptoms will clear up,—or, in other words, that it is a symptom-producing appendix.

POTTER VERSION*

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For quite a number of years it has been my observation that the length of time it takes to deliver the ordinary obstetrical case, and more particularly the second stage, has been increasing; also the number of cases that have required some instrumental delivery on account of inertia and fatigue has increased. This has been noted not only in primiparae but also in multiparae, until I have become convinced that the observation of Dr. de Lee and others that the delivery of the ordinary obstetrical patient is becoming more and more a pathological process instead of a perfectly normal, physiological one, is correct.

I have also been impressed with the fact that the number of forceps cases is on the increase, and accompanying these forceps cases, at least in my hands, tears have been more or less frequent, some of them of quite a severe degree, particularly tears of the upper vault of the vagina and also of its lateral walls. Many of these tears I am certain occur with other practitioners, and I am also sure have been overlooked in the past, and that the perineum itself has been the only part that has been examined for tears, and that more or less superficially. When one carefully examines these cases after forceps, getting in a good light, and going over the entire vagina, the number of lacerations is certainly appalling with the forceps operations even in the best of hands, so that when the method of doing versions as devised by Dr. Irving W. Potter of Buffalo, N. Y., was brought to my attention, and after reading his several papers upon this subject, more particularly as to his method of delivery, the time and the indications, I decided to try it out on a series of cases and see if my results would come up to observations.

I am prepared to state that I believe that the Potter method of doing versions is one of the greatest advances in obstetrics during the last decade.

The question of the alleviation of pain during the second stage of labor, and in some degree during the first stage, is one of the demands of modern obstetrics. Heretofore we have attempted to relieve it by the use of chloroform, ether or gas. Then came "twilight sleep," which never did get a very strong hold, and later shortening the process of the second stage by the use of forceps came into vogue. Now we have the Potter version, which I believe will meet this demand better than anything else that we have tried so far. Needless to say, Dr. Potter is a master of the art of doing this version, and it is from him that we must learn the method. In order to place his method before you I will attempt to give you concisely the essential rules that he lays down:

When you have satisfied yourself that the cervix is completely dilated or completely dilatable, the patient is pulled down to the end of the table, or, if in the home, laid crossways on the bed. The feet and legs are put in a modified Waleher position, i. e. not in extreme Waleher but a position about halfway, so that they hang over the edge of the bed or table. The parts are thoroughly scrubbed with soap and then thoroughly rinsed; shaving the vulva is a matter of choice. Needless to say, the operator should prepare as for any surgical operation. The best rubber gloves to use are those of elbow length, so as to carry out as aseptic a procedure as possible.

The first step is the kneading out of the perineum. With the palm of the hand full of sterile green soap, the perineum is kneaded out first by inserting two fingers and stretching down, gradually kneading out the levator ani muscles on either side, then three fingers, and then four, until you are able to put your entire hand inside of the vagina. When you have done this, then you may knead the perineum out until the hands slides out easily. This can be done without any lacerations. It is understood that the patient has been previously completely anesthetized with chloroform or ether, my preference being ether; Dr. Potter prefers chloroform. After having thoroughly kneaded out the perineum, so that it is patulous (and this can be done even with the most rigid perineums with an ease and thoroughness that is surprising),

*Presented before the Minnesota State Medical Association, Duluth, Minn., August 1921.

then insert the hand up into the uterus through the dilated cervix, and if the membranes have not previously ruptured you swing your hand around the uterus and rupture the membranes high up, first having ascertained the position of the head. After rupturing the membranes you catch the feet in your hand and attempt to pull both of them down. When the knees are out of the vulva the baby turns, and the version is complete.

Gentle but firm traction is then made by placing one hand on the lower thigh, and the other hand on the upper foot, until the navel is delivered. The cord is then pulled down a trifle so as to be sure that it is not impinged upon and pulsation can be felt. Next, by firm and steady traction, keeping the shoulder under the symphysis, deliver the anterior shoulder. Traction is then made until the shoulder blade or scapula is entirely under the pubes, and then the arm is very easily delivered. The baby is then rotated until the other shoulder and arm are delivered anteriorly. This point is very important, and is quite a radical change from former methods. This prevents lacerations of soft parts.

After both arms are delivered, which is usually surprisingly easy to do, the fingers of the operator's hand are placed in the child's mouth, and pressure made upon the head just above the symphysis. Occasionally it may be necessary to have an assistant press upon the head, but usually you can handle it yourself, and if you do, you can regulate the pressure and the amount of flexion very much better. The object in placing the fingers in the mouth is to maintain flexion by pulling down the chin, so that the head will slip over the perineum very much easier. Heretofore, in my experience, this has been the most ticklish part of the version, but after being inspired with confidence by Dr. Potter's articles, it has now become a comparatively simple procedure. Gentle but firm traction is made with the fingers in the mouth until the mouth is delivered. The mucus is then swept out of the throat. We do not have to worry. The heart is beating, and the mouth is open so that the baby can breathe if necessary. Delivery of the rest of the head should be very slow, and the pressure on the

aftercoming head, with traction upon the mouth, should be well regulated, so as not to let the head slip through too quickly; otherwise, of course, a tear may result. The only object here is to maintain flexion. If extension is obtained, of course the difficulties are very much increased; it may be even necessary to apply the forceps to the aftercoming head, but if one has dilated the perineum properly this is not a hard procedure, and can easily be handled. The greatest temptation one has in this stage of labor is to be in a hurry, but haste is not necessary, and much is to be gained by going very slowly. You may take from five to twenty minutes or more to deliver after the version is done.

After the baby is delivered, Dr. Potter then gives a hypo of pituitrin to help in the delivery of the placenta. However, my experience has been that this is not necessary, and that by pressure upon the uterus the contractions very soon take place, and there has been at no time any evidence of hemorrhage that was in any way alarming.

For a long time I have been convinced that in the resuscitation of babies many of them are injured by the hard patting upon the back, immersion in hot and cold water, by the use of the pulmotor or artificial respiration by any method devised. Even before Potter's article appeared I had formed the habit of gently blowing upon the baby or else laying the baby aside, as long as the heart was beating, as I felt quite sure it would breathe within a very short time. This has also been brought out very markedly after version. Many of these babies do not breathe vigorously at first, but if the heart is beating one can lay them aside, and within five or ten minutes we will find them crying, and far better babies than they would be from spanking too much. Of course this is due a great deal to the fact that the baby itself is practically completely anesthetized, the mother of course being completely so. One would not think of spanking an adult who had been given ether in order to revive him, so why should we do it in these cases.

The perineum has been very carefully examined in all of our cases, the percentage of tears has been remarkably less than in any

previous series of cases we have had. Examination of these patients six weeks to two months later has convinced us that the perineums are very much firmer and in far better shape than after the ordinary delivery, in which we had during the second stage long continued pressure on the perineum. Comparing cases of the two methods, in neither of which there were tears, the version cases have better perineums. The end result is decidedly improved over previous experience.

Needless to say, all is not smooth and easy in doing these cases, and there are some difficulties which one can run into which it would be well to speak about:

(1) In a patient whose membranes have ruptured prematurely, and who has been long in labor, you will find it very much more difficult to do a version. However, if the patient is completely anesthetized, the difficulty will be very much lessened. In one of our cases there was such a marked Bandl contraction ring that it was impossible to do a version, and forceps had to be applied.

(2) An impacted head sometimes gives considerable difficulty. I would not say that in all cases in which the head becomes firmly wedged in the pelvis that it would be advisable to do a version, and forceps may be preferable. In all these cases, of course the question of relative size of the passenger and the passageway—all questions of experience and observation—would have to be thrashed out with one's own self.

(3) There are some slight observations to be made on the details of the methods pursued:

I have been able to use comparatively short gloves and steril gowns and get away with versions fairly well, but you would do very much better to have elbow length gloves.

The question of dilation of the cervix: If the cervix is completely dilatable version can be done with safety. The steady pull upon the feet also has a tendency to dilate the cervix very gradually, and is much better than the use of bags or anything of that kind.

Catheterization of the patient before version is attempted is very essential. This procedure is not only essential in versions but in all obstetrical cases. I believe it is a very large fac-

tor in the prevention of traumatism or tearing of the uro-genital triangle, and if catheterization is insisted upon the question of cystocele will be a very much less frequent one than at the present time.

As to the position of the fetus, we have found that twenty-five per cent of the cases are R. O. P. Textbook statistics on positions of the head when engaged are wrong, i. e. L. O. A. does not occur as frequently as they would lead you to believe. In breech cases, or coming breech, with the buttocks or with one foot, I am firmly convinced that it is better to change that into both feet down and deliver (as a Potter version), than to wait for the long, slow delivery that a breech case generally entails. Too, the question of delivering by Potter method of inserting the finger into the mouth and keeping up flexion, is very much to be desired over a possible extension of the head with all its attending difficulties. Delivery of the shoulder and the arm anteriorly, and then rotating and delivering the other anteriorly, is a very decided step in advance of the methods of doing a version.

The question has arisen as to whether there are apt to be more fractures of extremities than by the other methods. We have had no fractures in our series. I firmly believe, however, that the possibilities of fracture, etc., are very much less with this method than with the old method.

The question of pressure on the head: The only time that you should use any pressure at all in delivering the aftercoming head is after the arms have been delivered. If done before this time you are apt to shove the head down in between the extended arms, and then your difficulties certainly will increase. No pressure should be made upon the head at any stage until after the arms are delivered; then, of course, it is quite essential. I believe, however, that it is still better to make your pressure rather downward and crowding under the symphysis than to press hard from above. When the mouth is delivered you can feel perfectly safe that everything else is going to come along all right, the baby will breathe, and you can feel very comfortable at this stage.

Potter is of the opinion that cord complica-

tions cause more stillborn births than any other single complication. He even is bold enough to ligate the cord before delivering the head in some of his cases in which he is quite sure that the cord is too tightly wound about the neck. His observation that a white baby is more to be feared than a blue one is perfectly true.

My own experience may be summed up in my last one hundred and forty-five cases:

Fifty-two of them have been Potter versions; thirty-four of the fifty-two were primiparae, and eighteen multiparae. I found L. O. A. presentations in thirty-five cases; thirteen cases were R. O. P., and four cases R. O. A.

The infant mortality in this series of cases has been four babies dying within two weeks after birth.

The first infant fatality was in a patient 40 years old, primipara, in labor twenty-four hours. After being two and one-half hours in the second stage of labor, forceps being rather difficult, attempted to do a Potter version. There was no trouble in doing the version, but the head was exceedingly hard to deliver. Delivered with considerable laceration. The baby was born alive, and lived twenty-four hours. The cause of death was not ascertained, autopsy not being obtainable, but apparently it went out with some sort of cerebral irritation.

The next case was one in a patient 32 years of age. In labor twenty-four hours. Dry birth, as in the previous case. Version was attempted after the cervix was completely dilated, but a very marked Bandl's contraction ring was found. The anesthesia was not as good as it might have been. With a great deal of difficulty a version was done, and baby delivered, but baby was stillborn.

These two cases were early ones in the series, and I am quite sure that my judgment now would be a little different in the handling of these cases, and that I would not attempt a version, but either do a forceps or a Cesarean section. Both cases were rather rigid types of pelvis, with dry labors, extending over a period of twenty-four hours, and both babies much larger than the ordinary for primiparae.

The third case was one in which the version was comparatively simple. The baby was quite large. The baby died in spite of everything

that could be done to make it breathe. It evidently went out with some irritation of the meninges, as there were convulsions, twitchings, and spastic irritation of the nerves affecting the lower jaw and the left eyebrow. Spinal puncture was negative.

The fourth case was one of twins, which were not well developed, the mother having been sick throughout the entire pregnancy, and the baby died from melena.

However, the rest of the babies have been very fine babies, the heads not molded, no evidence of any convulsions, and they have all done very well.

I have not had time to run down the temperatures in these newborns, but the general impression seems to be that babies on which you do a version and save the extremely hard molding that accompanies the delivery of the normal baby, have less temperature than those in which forceps or long second stage pains have had a chance to mold the head. However, we have not been able to check this properly before going on record.

Now, as to the condition of the mothers: Tears that have been sustained in all the cases have practically been of very mild degree, except these few in which the babies happened to die, and in which the case was very hard to deliver, generally requiring only one catgut or silkwormgut stitch in order to stitch the fourchette. The degree of laceration is certainly very much less than in the previous cases in which forceps were used or in which the patient was allowed to terminate the pregnancy spontaneously.

Mothers, as a rule, the day following the delivery, are fresh, happy, and in no degree have they been fatigued as in those cases delivered in the other ways.

There has been no maternal mortality. The maternal morbidity shows one patient with a temperature of 101° on the fourth day only, a patient with 100° on the first day, and a patient who ran a temperature from the eighth day to the end of the third week, and had an infection of the tubes, subsiding spontaneously. One patient ran a temperature from a definite pyelocystitis, which was present before delivery. Another patient ran a temperature from a

definite mastitis. All the rest have had normal temperatures throughout their puerperium. This is an exceedingly low morbidity temperature record, and certainly should speak well for the method used. This record is very good proof that the danger to be feared from putting the hand up into the uterus, if done under proper surgical conditions, is of no consequence whatsoever.

The question has been raised as to whether Potter version should be advocated or taught to students. I am firmly convinced that the old method of doing versions is obsolete, and that this new method of doing versions should be taught and demonstrated to students. It is not hard to do, and if done under proper conditions should not offer more complications or as many as using forceps. I would not advocate that Potter version be done in all cases arriving at the second stage, but I still believe that there is a very definite indication for it in second stage labor, and that it has very many advantages.

(1) Our observations and those of others have been that Potter version, with proper kneading out of the perineum, does protect the maternal soft parts.

(2) The morbidity is decidedly lessened on account of the fact that the patient is saved the second stage of labor and the fatigue that goes with it, so that she is better able to resist infection.

(3) There is no question but that the patients are exceedingly pleased with the way in which their cases are handled when they are able to escape the pain of the second stage.

(4) I feel certain that the maternal and infant mortality will be a great deal less when this method is better known.

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DISCUSSION

DR. L. W. BARRY, St. Paul: With a normal pelvis, the bag of waters unruptured, complete dilatation of the cervix and deep anesthesia, podalic version is comparatively easy in skilled hands. Not every one can do a version and do it quickly and properly. If the practitioner will measure his pelvis carefully and determine whether he has a flat or a contracted pelvis

to deal with, he will not do a version in every case. Why? Because nature is very wise. If the child comes head first, the slow moulding of the head and overlapping of the cranial bones will lessen the tendency to sudden tearing of the subdural veins and thus materially lessen the occurrence of intracranial hemorrhage.

The fetal mortality with Potter version is liable to be very high. If one is not careful about measuring the pelvis he will do versions in cases with a slight contraction of the pelvis. According to Williams, we have a variation of between 6 to 13 per cent of contracted pelves and the majority of these are of a mild degree and very difficult of recognition. If a version is done in one of these cases, the sudden compression of the fetal head coming through the brim will tear the delicate intracranial veins, with resultant hemorrhage. This is true in normal breech deliveries with a fetal mortality of between 6 and 33 per cent.

Another point about the Potter version: If one attempts it when the bag of waters has partially drained away, he will find that he has a difficult proposition with which to deal, especially if the child is large. One should not become too enthusiastic about the Potter version. The man who attempts a version in every case will have a high fetal mortality. Carter reports a fetal mortality of 16 per cent with the Potter version. The fetal mortality will correspond to the number of cases of contracted pelves and the skill of the operator. Potter reports a fetal mortality of 8 per cent and he is a master of his own technic. How much greater will be the mortality in the hands of novices?

Finally: It is very important to measure the pelvis before doing a Potter version, due to danger of sudden compression of the head, with resulting intracranial hemorrhage. Be certain that you have plenty of fluid in the uterus. I have seen two cases in which rupture of the uterus had occurred after the rupture of the bag of waters and the development of a contraction ring. In pushing up the fetal head and turning the body of the child the thinned out lower uterine segment was ruptured, the woman dying of hemorrhage and shock. I think chloroform is the best anesthetic if complete relaxation is desired. Have a trained anesthetist. I have attempted to do a version with a nurse giving the anesthetic and found when I got my hand into the uterus, the uterus would contract and render version almost impossible. Deep anesthesia is very essential to an easy version.

As to the Potter technic of ironing out the perineum: It is a good procedure but a well executed episiotomy will allow a surprisingly easy birth of the after-coming head.

As to getting both feet: At times in a version one is very glad to get one foot. If you can easily get both feet do so; if you cannot, take any foot you can get.

I cannot recommend a Potter version in every

case simply to save pain, but I do think it a good procedure in the case of a prolapsed cord, or where the fetal heart is going bad. One could recommend it in cases of persistent occiput posterior positions in primiparae, but unfortunately in a great many cases of posterior positions labor begins by a rupture of the membranes. These women stay in labor a long time and when the cervix is dilated the amniotic fluid may be drained away to such a degree as to render a version very difficult or even impossible.

In multiparae when the cervix is dilated, by rupturing the bag of waters and giving 3 to 5 drops of pituitrin I can get the baby before the nurses have time to drape the patient.

DR. JAMES ROLLIN MANLEY, Duluth: I want to say a few words in support of this method. I had an opportunity a year or so ago of visiting Dr. Potter and of seeing him do several of his versions. I have had a personal experience of some 15 cases, and I want to give you my impressions.

There is no question but what Dr. Potter has given the profession a valuable method of delivery. Like every new thing brought out, it will be abused, and it will be done when it should not be considered. But if the cases are gone over carefully and the proper ones selected for version, we are going to prevent a great deal of pain and suffering in the second stage of labor.

Dr. Coventry has described Dr. Potter's method very clearly and has told exactly how he does version. Dr. Potter is very kind and courteous. When any one goes to Buffalo he takes him around and allows him to examine the cases, and he answers all questions you want to ask. It is true, that in a certain number of cases of contracted pelvis version should not be used. Dr. Potter gets around that by doing a Cesarean section. He does eight per cent Cesarean sections. In 1100 cases, he did 80 Cesarean sections, and if he does not do version he does the Cesarean operation. Most of us would use forceps on a good many of these cases. He is extremely deliberate in his work.

The first case I saw him do a version on was a primipara. The cervix was fully dilated, and he allowed me to examine her, and she had an apparently normal pelvis. He got the feet down as Dr. Coventry described. He got down to the navel, and I timed him, and I became very nervous standing around. I was inclined to tell him to hurry up. I was afraid he might lose the case. It took him fourteen minutes to deliver from the navel until he got the head. Down in New York they told me that if you should see the baby begin to breathe before the head is born, do not advise Potter that it is breathing. He is waiting for you to say the baby is trying to breathe. He says that these babies are not breathing; they have spasms of the diaphragm, and they do not get any mucus in the throat. He says that babies stand asphyxia better than they stand a broken neck. The reason for the mortality in ver-

sions is due to too great pulling on the body and the babies are born absolutely dead. Potter said he would rather take chances on asphyxia than injuries to the cord. There is no question but what the lacerations are less, and there is absolutely no more fever or danger than in the old methods of delivery. My personal experience has borne that out.

I think the contraindications, as stated by Dr. Coventry and Dr. Barry, are true. I do not attempt version in a small pelvis or in a case where I think it is going to be very hard, but in normal cases you can deliver the women easily and save them a great deal of suffering.

I have had no fetal mortality except in one case, and I do not blame the version for it. It was a prolapsed cord when I saw the case and I could not feel any pulsation.

DR. ROBERT EMMETT FARR, Minneapolis: I had the pleasure and privilege of hearing Dr. Potter read three papers on this subject. I was not especially interested in the technic, but I was interested from the standpoint of the prevention of pain. Pain is a very good thing to call attention to what is taking place in the human body, but if there is any way of stopping it, that is compatible with good treatment, we should consider it.

Dr. Potter read these papers before the American Association of Obstetricians, Gynecologists and Abdominal Surgeons, an organization composed of some excellent men, many of them holding professorships in our leading universities.

When Dr. Potter first presented this subject he was considered extremely radical, and there was a feeling among many of the men that he should be dropped from the organization. However, upon visiting his clinic and seeing him work, the sentiment has entirely changed. The second paper he read was received with much more approbation, while his last paper received almost no criticism. It is a noteworthy fact that those who have seen Potter work do not continue to criticize him adversely. Most of them seem to think that with his limitations the method is good.

I rise, therefore, to ask you to keep your minds open in regard to this matter until we know more about it. I have been a propagandist myself, and I know what one has to go through. If the subject is sufficiently important, I believe that the critics of the method should see it under the best of auspices before condemning it.

DR. W. H. MAGIE, Duluth: As Dr. Farr remarks, I also do not claim to know much about the subject of obstetrics. However, I do know, or think I know, that if God Almighty thought it better to have children born feet first, he would have planned it that way. Nature intended that the force was to be applied above and the child pushed out. Potter's method directs that the child be pulled out. Dr. Farr says that one of the advantages is that it is a painless delivery. I would like to ask him upon what he bases the claim

that it is a painless delivery. It is painless because the patient is anesthetized. In the practice of obstetrics, I have found that a large percentage of my cases, if I did not hurry, were delivered by the time I arrived. As I understand it, these cases are to be treated by Potter's method in spite of the fact that if left alone they would have been delivered by nature's method. We have fads in medicine and surgery. This is a fad and will soon be cast aside with many others. Only a few years ago there was a fad for delivering babies through the belly. We had at least one instance in Duluth where the physician, who was anxious to have the reputation of having done a Cesarean section, undertook the operation in one of our hospitals and the patient died upon the operating table. This woman had given birth to five children in the normal way. I know of another case that occurred in Duluth hospital, where the nurses were preparing the patient for Cesarean section and the patient was on the operating table when the nurse discovered that the baby was about to be born. She exclaimed, "If you don't hurry up doctor, the child will be born" and it was born in a short time in the natural way.

DR. WILLIAM A. COVENTRY, Duluth (closing): I have only a few words to add to what I have already said. It is needless to say that we examine all pelvis and know what we are doing. If you do not get any other thought from this paper except the method of doing a Potter version, I shall feel amply repaid. You can work out the rest of it for yourselves.

My experience in observing doctors in different parts of the country has been that when they come to do version they blow up, so to speak. It is done as a last resort. They pull and yank and tear the baby all to pieces. I do not advocate version in all cases, but when I think it is indicated I do not hesitate to do it.

BLOOD TRANSFUSION WITH SPECIAL REFERENCE TO THE SODIUM CITRATE METHOD*

MAX H. HOFFMAN, M. D.

History, Review of Literature,
Report of Transfusions, Cases, and Results.

Although blood transfusion is supposed to be a relatively late accomplishment, writers on its history find many references pertaining to that procedure in the Bible, the manuscripts of the ancient Egyptians, and in the writings of the early Greeks and Romans.

Ovid, in his *Metamorphosis*, Book Seven, is

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quoted by McClure and Dunn¹³ as saying, "Why now do ye hesitate and do nothing? Unsheathe your sword, and draw out the old blood that I may fill the empty veins with the blood of youth."

In the same year that Columbus sailed to America, the physician, Savonarola, is said to have transfused Pope Innocent the VIII. The three youths who were used as donors, according to records, died as the result of getting air into their veins, while the Pope received no benefit.

Libavius, in 1615, did an artery to artery transfusion by means of a silver tube. In 1667, a Frenchman, Jean Baptiste Denys of Montpellier, transfused blood from the veins of a lamb to those of a young man. This is the first really authentic record of the transfusion of blood into a human being.

So it appears that before Harvey discovered the circulation of the blood (1616), transfusions had been performed. At about the same time, Lower, in England, transfused blood from the carotid artery of one dog to the jugular vein of another by means of a quill. He also experimented with anticoagulants.

In the eighteenth century much work was done in the perfection of blood transfusion in Germany. Landois¹² devised a method of vein to vein transfusion by means of cannulae and tubing.

In the United States, Halstead did refusions in cases of carbon monoxide poisoning, i.e., he withdrew blood, defibrinated it, and reinjected what was left. This method was later abandoned.

DEVELOPMENT OF TECHNIQUE

In 1892, von Ziemssen³⁶ devised the syringe and cannula system for the injection of whole blood. He was also the first to note the effect of transfusion on anemias. His original method was modified many times; by Lindeman¹³ in 1914, and Unger³³⁻³⁴ in 1915. The latter method has proven to be a definite advance over the other syringe cannula systems.

Carrell and Crile attempted to improve on the above indirect methods, by affecting a method of direct approximation of the blood vessels of the donor and the recipient. The objection to this method is that its use is accom-

panied by many difficulties; and it is successful only in the hands of deft surgeons.

Another method which at the present time is used by many surgeons, is the one in which blood is allowed to run into paraffin coated tubes by means of a cannula placed in the isolated vein of the donor. The vein of the recipient is exposed, and the blood is injected into it. The objection to this method is that the veins of both donor and recipient are rendered useless for any further transfusions.

The most important advance in transfusion was made possible, not by means of new mechanical devices, but by the use of chemical substances.

In 1914, Satterlee and Hooker³⁰ first reported the use of hirudin with good results. Later, they advised against its use on account of the uncertainty of its action and the possibility of contamination by toxic substances. Prior to this, Engleman⁶ reported the administration of .3 gram doses of hirudin in cases of eclampsies without any toxic symptoms. In the hands of others, this drug has caused many accidents and its use has been abandoned.

Many other anticoagulants have been tried, such as magnesium sulphate, sodium tartrate, sodium metaphosphate, sodium oxalate, and sodium citrate. Of these, sodium citrate has proven to be the best.

The anticoagulation properties of sodium citrate were known long before it was made use of in blood transfusions. Several men claim priority for its use for this purpose; but the credit is generally conceded to Hustin⁹ of Belgium, who described this method in April 1914.

Weil,³⁷ in this country, read a paper on the same subject in December of the same year without any knowledge of Hustin's work, and in the following year Lewisohn,¹⁷ in January, and Rueck,^{27 28} in February, also claimed priority.

A considerable amount of investigation has been made to determine the optimum amount of sodium citrate which will prevent coagulation, and also to determine the smallest amount which would give toxic symptoms.

The drug has been given intravenously in doses as high as 5 grams without producing any toxic effect whatsoever. A solution as low

as 0.2 per cent is sufficient to prevent coagulation.

The action of sodium citrate as an anticoagulant is explained by the formation of a double calcium salt which in vitro inactivates the calcium and thus prevents coagulation.³¹

A peculiar phenomenon which has not been explained is the fact that in vivo it shortens coagulation time. Weil found that 5 grams of sodium citrate shortened coagulation time by one half.

Recently it has been used in thrombo phlebitis and in thrombo-angitis obliterans,³² on the supposition that it lengthens coagulation time, and thus decreases the tendency to further thrombus formation. But, as Weil has shown, it shortens coagulation time in vivo.

Several extensive investigations have been made to determine its toxicity and the rate and manner of its excretion. Battelli and Stern² believe that it is entirely oxidized in the tissues. Most of their experiments were performed in vitro, and they found that the freshest tissues oxidized sodium citrate faster than the old ones.

Salant²⁹ and Wise, using cats and rabbits as experimental animals, found that sodium citrate disappeared very rapidly from the circulation. As much as 70 per cent disappeared during the first half a minute; and 10 to 20 percent was lost during the next 20 minutes.

In cases where the amount injected was more than .5 grams per kilo, a considerable percentage was recovered in the urine. If doses of less than .5 grams per kilo, none of the salt was found in the urine. Salant and Wise concluded from their investigations that sodium citrate is oxidized mainly in the blood, and that its toxicity depends on the ratio of the rate of injection to that of excretion. They found that it required 67 milligrams per kilo of body weight to produce definite toxic symptoms.

An interesting fact brought out in the above investigations was that animals which did not react following the first injection frequently reacted after the second injection. They found that the oxidation and elimination took place at a much slower rate than in subsequent injections.

Many transfusions are followed by reactions of greater or lesser degree and this has led to a number of investigations to determine their cause. Novy and DeKruif²² have shown that the toxicity of blood increases proportionately with the length of time since withdrawal from the veins. Hemolysis may be the cause for many reactions; but with properly grouped blood and good technique this does not occur.

Drinker⁵ and his collaborators have shown in a series of experiments that there is some toxic change produced in the erythrocytes and other blood constituents by the sodium citrate. Although this might explain to some extent the reasons for more reactions with the sodium citrate method, it is not the only factor, since a large percentage of reactions occur with unmixed blood transfusions.

At the Mayo clinic⁴ it is believed that some of the reactions are due to materials in new rubber tubing. Food substances, circulating in the blood, especially proteins, might be a cause of reactions. For that reason it is well to have the donor miss a meal before withdrawing the blood.

Very few reactions following transfusions are serious enough to inconvenience the patient. Deaths have been reported, but in most cases they were due to wrong grouping or carelessness in technique. The degree of severity of reactions varies a great deal, but most of them consist only of a slight rise in temperature; some have severe chills and sweating.

In several reports including large series of citrated blood transfusions, the percentages of reactions vary from 15 to 64 per cent. One author reports a series of 150 cases without a chill.

Bernheim³ found little difference in the percentage of reactions between mixed and whole blood. In all cases he got about 22 per cent reactions of varying degrees. In a review of 280 cases at the Presbyterian Hospital in Chicago, Melency and others¹⁹ had 63 per cent reactions of some degree: 70 per cent by the sodium citrate method and 26 per cent by the syringe cannula method (whole blood). Lindeman^{14 15} got 33 per cent with the syringe cannula method. Hunt⁸ reports 18.7 per cent chills and 1.5 per cent mild reaction, using ci-

trated blood. McClure and Dunn found that 66 per cent of their cases developed reactions; of these 13 1-3 per cent were severe, 16 2-3 per cent slight reactions, 10 per cent chills, 22 2-3 per cent slight elevations in temperature (over 101°) 5 1-3 per cent skin eruptions and other various types of reactions.

BLOOD GROUPING

Experience has shown that most of the serious reactions following blood transfusions are due to the incompatibilities of the blood of the donor with that of the recipient. A study of these incompatibilities has resulted in the classification of all bloods into four groups, depending upon the agglutinating reaction of the serum upon the red cells.

The simplest and most reliable method of determining the group of any donor or patient is Minot's²⁰ modification of the Moss method. According to this method, by the use of serum from Group II and Group III, all bloods may be separated into their respective groups.

The serum from individuals of these two groups is collected and preserved in small ampules, each ampule as a rule containing sufficient serums for one test. These sera when kept in the ice box will remain potent indefinitely.

The method of performing the test is as follows: one or two drops of the patient's or donor's blood is collected in a small tube containing about a cubic centimeter of a 1 per cent solution of sodium citrate in physiological saline. This gives a suspension of the red blood cells.

Drops of Group II and Group III sera are placed on clean glass slides, and small drops of the blood suspension are mixed with each of the sera. The slides are now inclined in different planes, so as to give the corpuscles a chance to move in the serum and to come in contact with one another. If the cells are not agglutinated by the serum, they will remain separate and diffusely scattered through the drop. At most, they will not form more than short, irregular rows of cells (roulette formation); such a result is negative.

If, however, the cells become grouped into large or small closely packed clumps, agglutination has taken place, and the result is a posi-

tive one. The agglutination may occur in a few minutes, but it may be delayed 15 to 20 minutes.

Of the several groupings that have been devised for the classification of blood, the committee¹⁰ appointed by the American Medical Association has chosen the one devised by Jansky, on the basis of priority.

The scheme of this classification is as follows:¹⁰

Cells	Serum			
	Group I	Group II	Group III	Group IV
Group I	—	—	—	—
Group II	+	—	+	—
Group III	+	+	—	—
Group IV	+	+	+	—

Positive (+) means agglutination.

Negative (—) means no agglutination.

Another classification, that of Moss²¹ is as follows:

Serum	Agglutinates corpuscles of	Corpuscles agglutinated by the serum of
Group I	None	Groups II, III and IV
Group II	Groups I and III	Groups III and IV
Group III	Groups I and II	Groups II and IV
Group IV	Groups I, II and III	None

The percentage of incidence of these 4 groups according to the Moss classification is as follows: Group I, 5 per cent; Group II, 40 per cent; Group III, 10 per cent; Group IV, 45 per cent.

In giving transfusions, one tries to secure a donor whose blood falls in the same group as that of the recipient. However, in cases where identical groups are difficult to obtain, a donor may be used whose serum may agglutinate the recipient's red cells, but whose cells will not be agglutinated by the recipient's serum.

For this reason, Group I in the Moss classification, and Group IV in the Jansky classification, are universal recipients; and Group IV of Moss, and Group I of Jansky, are universal donors.

This is possible because it has been shown that blood from a donor whose serum agglutinates the recipient's cells, can be injected up to $\frac{1}{4}$ of the volume of the recipient's blood. According to Ruben and Ottenberg,²⁶ intravascular agglutination depends on three factors: (1) the concentration of the agglutinin,

(2) the absorption of the agglutinin by an excess of non-agglutinable cells, and (3) the interference with agglutination by an excess of non-agglutinable cells.

There are some who believe that the donor's cells should be tested against the recipient's serum directly,^{35 11} claiming that the indirect method, i.e., grouping method, does not always show agglutination. Dr. Moses Barron in an unpublished investigation of a large series of cases found that there was no variance between the direct and indirect methods of agglutination.

INDICATIONS FOR TRANSFUSION

The indications for transfusion are many, and the list is gradually being extended. Ottenberg and Libman²⁴ have given the best classification of the conditions in which transfusions are of value. They are as follows:

I. Transfusions for simple hemorrhages

1. Gastric and duodenal ulcer.
2. Dysentery.
3. Typhoid hemorrhage.
4. Ectopic pregnancy.

II. Transfusions in connection with surgical operations

1. Preliminary to operation.
2. For post-operative hemorrhage.
3. For shock.

III. Transfusions for the cure of hemorrhagic conditions

1. Purpura hemorrhagica.
2. Hemophilia.
3. Hemorrhages secondary to
 - a Blood disease.
 - b Severe infections.
 - c Jaundice.

IV. Transfusions for blood diseases

1. Pernicious anemia.
2. Leukemia.

V. Transfusion for infections.

1. Infections with pyogenic organisms.
2. Subacute streptococcal endocarditis.

VI. Transfusions for intoxications

1. Acute poisoning (carbon monoxide, etc.)
2. Diabetic coma.

VII. Transfusions for debilitated conditions

1. Coma.
2. Malnutrition.
3. Simple anemia.

Disease	No. of Cases	No. of transf.	Reactions				Therapeutic Results			
			Mild.	Mod- erate	Severe	Very Severe	No Imp.	Sl. Imp.	Mod. Imp.	Marked Imp.
Pernicious Anaemia	15	56	6	2	2		2	2	6	5
Leukema	3	11					1		1	1
Secondary Anaemias	7	18	1	1	1	1		5	2	
Purpura Rheumatica	1	2						1		
Purpura Hemorrhagica	1	6		1			1			
Septicæmia	3	4					2	1		
Cancer	2	2	1						2	
Post Operative and Preoperative	5	5		1			2	3		
Puerperal	1	1						1		
Totals	38	105	8	5	3	1	8	13	11	6
			7.6%	4.8%	3%	.9%				
			Total Reactions—16.3%							

Weil, and Ottenberg and Libman have clearly shown the value of citrated transfusions in hemorrhagic conditions and secondary anemias.

Its beneficial effect in pernicious anemia is attested to by the reports of large series of cases to be found in the literature.

In septic conditions the results have been disappointing. Transfusions have been used in diseases such as puerperal sepsis, septic endocarditis, and other septicemias of various kinds.

Polack²⁵, in a series of cases of puerperal sepsis, achieved good results in a majority of his patients by using small injections at 3 day intervals. He believes that they stimulate cellular proliferation which aids in combating the infection.

Attempts have been made to immunize an in-

dividual against a particular bacterium, and then transfuse his blood into another person infected by the same germ¹⁶. These results have been unsatisfactory.

Onani²³ and others have shown that in citrated blood phagocytosis is stimulated by a substance similar to atropin. In his experimental work, however, a larger percentage of sodium citrate was used than is used in human transfusions. Most of the reports on the results of transfusion of blood in septic conditions leave the impression that it is of little value.

Ashby¹ has shown that the erythrocytes of transfused blood can live and function 30-40 days. This frequently is sufficient to tide an individual over an emergency period.

Surgeons generally do not wish to operate on a patient having a hemoglobin of less than 40

per cent. One or more transfusions often bring the hemoglobin from 20 or lower up to the point where the patient is a good operative risk as far as the blood is concerned. During an operation when a large amount of blood has been lost, or where the patient is in danger of shock, transfusions are of value in restoring blood volume and raising blood pressure. Physiological saline has been used for this purpose, but it has been shown that excretion and elimination are very rapid; the beneficial effects from its use are therefore very temporary. For this reason, acacia solution, which is excreted much more slowly, has proven of greater benefit.

In carbon monoxide poisoning, venesection followed by transfusion is a generally accepted treatment. This is a means of replacing incapacitated cells by those capable of carrying oxygen.

Hemorrhagic conditions of the new born have been very successfully treated by transfusions. Of late, however, this method has been supplanted by subcutaneous injections of small quantities of whole blood, which have been found to be equally efficacious.

REPORT OF TRANSFUSIONS

We have performed a series of a little over 100 transfusions at the University Hospital during the past nine months, on 37 cases. The accompanying chart indicates the number of cases of each disease and the number of transfusions performed on each disease. It also indicates the reaction which we have classified as being mild, moderate, severe, and very severe. The mild reactions are those in which the temperature rises a degree or two, but the patient experiences no ill effects whatever.

Under moderate reactions we classed those with a rise of temperature and chilliness, the patient feeling only slightly uncomfortable.

Under moderate reactions we classed those patients who developed chills and who felt definitely uncomfortable. The one reaction recorded under the very severe group was in a case where blood of the donor was incompatible with that of the recipient.

ILLUSTRATIVE CASES:

A few cases have been selected to illustrate the therapeutic effect of transfusion in the various diseases; these cases will be described in some detail.

Case I. Mr. S. H., Hosp. No. 20388, entered the

hospital in a very stuporous condition, extremely weak and vomiting. He could hardly talk because of weakness, and would fall asleep while being questioned. He had difficulty with urination. At first he had to be catheterized; later he had involuntaries.

The history of his present complaint dates back for a period of five years, when he first noticed that he was getting pale, and that he developed frequent attacks of glossitis. Later, he developed eruptions in his mouth and severe nose bleeds. Still later, his skin became yellow and he experienced attacks of severe pain in the region of his liver.

He was very weak for about a year, and then had a remission which lasted for six months. Following this he had a gradual recurrence of symptoms until he entered the hospital.

A physical examination at that time showed a male, age 30, very stuporous, pale, and somewhat yellowish. The liver was enlarged and tender, spleen not palpable. There was a marked edema of the inferior extremities.

The blood on entrance showed a hemoglobin of 10–12 per cent; erythrocytes 500,000; leukocytes, 5,000. The blood smear showed a marked anisocytosis with a large number of megalocytes and microcytes. There were no nucleated red cells. He was given two transfusions at four day interval of 250 cc. of citrated blood. In 13 days his hemoglobin was 20 per cent, erythrocytes 1,500,000. A week later he was given another 300 cc. injection, which was followed by a rise in hemoglobin to 39 per cent, with 2,400,000 red cells.

Before leaving the hospital he was up and about the greater part of the time, and except for pain in the hepatic region he stated that he was very much improved in strength and subjective sensations.

Case II. Male, age 33, Hosp. No. 20734, by occupation a glass blower. He came into the hospital complaining of numbness and sandy feeling in his fingers and toes. He noticed these first symptoms about three months before entering, at which time he bled a great deal from hemorrhoids.

He was very weak; his gait unsteady and staggering; and he had a great deal of edema around the ankles.

On entrance his blood examination showed a hemoglobin of 16 per cent, with 936,000 red cells and 4,400 leucocytes. He received three transfusions of 350 cc of citrated blood, and one of 450 cc of blood. At the end of two and a half months his hemoglobin was 64 per cent, erythrocytes 3,100,000. There was no sign of new blood formation in the smear. He got along very well for five months, when his symptoms again reappeared.

Case III. This was a very interesting case of chronic myelogenous leukemia, Hosp. No. 19065, female 26 years old. Her present illness began in July 1916. The onset was marked by anemia, headache, and jaundice.

In November 1916, she began to have cramps in the

left flank. In March 1917, she had a splenectomy at the Mayo Clinic, preceded by radium treatment.

She felt very well up to January 1919, when she developed pallor and loss of appetite. She returned to the Mayo Clinic where she was given radium treatment again with good results.

In September 1919, she vomited a great deal of blood and entered the hospital in a comatose condition.

Her blood examination on entrance showed a hemoglobin of 15 per cent, red cells 1,650,000, leucocytes 364,000. A large number of myelocytes and nucleated red cells were present in the blood smear. She was transfused with citrated blood five times, and left with a hemoglobin of 56, red blood cells 3,800,000, leucocytes 62,000, with a marked decrease in the number of early white cells.

She returned March 3, 1920, having felt well up to three weeks before entrance. Her throat was sore, neck stiff, and she had been expectorating a little blood. She had gained fifteen pounds since her discharge.

Her blood examination on her second entrance showed 53 per cent hemoglobin, 1,800,000 red cells, 130,000 leucocytes. The smear showed a large number of myelocytes and premyelocytes, also nucleated red cells.

Her third entrance was June 21, 1920, having been well up to three weeks before that time. Her hemoglobin was 14 per cent, red blood cells 1,920,000, leucocytes 320,000, myelocytes and premyelocytes 64 per cent. She was transfused three times and on her discharge her blood showed 44 per cent hemoglobin, 3,000,000 erythrocytes, 72,000 leucocytes, with 16 per cent myelocytes.

Her fourth entrance to the hospital was August 16, 1920, on account of severe epistaxis. Her blood examination at that time showed 18 per cent hemoglobin, 1,900,000 erythrocytes, 350,000 leucocytes, of which 48 per cent were myelocytes. She received two transfusions of 500 c.c. each, and on discharge her hemoglobin was 34 per cent, 2,400,000 red blood cells, 147,000 leucocytes.

She went home, and two months later she had a very severe attack of small pox. On visiting the hospital one month after her recovery from small pox, her blood picture showed a hemoglobin of 35 per cent, 3,000,000 erythrocytes, and 280,000 leucocytes, with a large percentage of myelocytes.

It was interesting to observe how very little blood change resulted from the attack of small pox. She died at her home on March 1, 1921. The immediate cause of her death was unknown.

Case IV. Another case of leukemia, of a woman age 59, Hosp. No. 19761. This was of the chronic lymphatic type. Although her disease was chronic, her blood picture was that of an acute leukemia—the large lymphocytes predominating. She was sent to the hospital for an operation on account of an abdominal tumor, which proved to be a large spleen.

Her blood count on entrance showed a 55 per cent

hemoglobin, 4,000,000 erythrocytes, 63,000 leucocytes, of which 73 per cent were lymphocytes. She was given 450 c.c. of citrated blood, and coincidentally an x-ray treatment was given to the spleen.

In less than three weeks her white count went down to 8,000, with 51 per cent lymphocytes, the large lymphocytes still predominating. Four months later her leucocyte count was still normal, but unfortunately the differential count continued to show an abnormally high percentage of lymphocytes. It is difficult to say which treatment, i. e., x-ray or transfusion, had the greater effect in reducing the leucocyte count.

Case V. Hosp. No. 20184, female, 20 years old. This patient entered with a diagnosis of purpura hemorrhagica on November 11, 1920. She complained of weakness, vomiting, and an eruption over her body. By occupation she was a clerk. There was no history of purpura or hemophilia in the family. As a child, she had meningitis, pleurisy, and frequent tonsillitis.

In July 1919, she noticed a few red spots on her ankle. In August she had nausea, vomiting, and pain in her lower right abdomen. She was taken to the hospital for an appendectomy, where her purpuric condition was discovered.

She was transfused, and improved somewhat for a short time. Later, she was again taken to the hospital for a tonsillectomy, at which time she received another transfusion.

Physical examination on entrance showed many brown macules over her feet and legs. The mucous membranes were all very pale. Her blood count showed a hemoglobin of 50 per cent; erythrocytes 4,000,000, leucocytes 8,000, platelets 176,000; bleeding and coagulation time were normal. There was considerable blood present in the urine, but none was found in the stools.

These findings clearly indicated that her condition was one which belonged in the purpura rheumatica group, and not in the hemorrhagic group. All told, she received four transfusions; two before entrance, and two at our hospital, with no improvement. This result is exactly what is to be expected in this type of purpura.

TECHNIQUE USED

The amount of sodium citrate used varies from a 0.2 per cent to 0.5 per cent solution. In our work, we started using 15 c.c. of a 1.5 per cent solution for each 100 c.c. of blood to be transfused. This makes a .22 per cent solution. At this time we were using a syringe cannula system, and had some difficulty with the syringe binding. We then increased the amount of sodium citrate solution up to 20 c.c. giving us a 0.3 per cent solution, which we have used with great satisfaction.

On account of the many disadvantages in the

various types of apparatus which are used in citrated blood transfusions, we have devised an apparatus which obviates many of the objections. We have described this apparatus in detail in a previous article⁷.

In our hands, it has demonstrated itself to be an extremely efficient apparatus on account of its ease of manipulation, cleanliness, safety, and compactness.

The necessity of maintaining operating room asepsis after the apparatus is sterilized, applies only to the handling of the needle, and the preparation of a small area of the arm where the needle is to be inserted, as the entire apparatus is closed. Transfusions can be done at the bed-side, in the home, without fear of septic complications.

THE DONOR

In addition to the suggestions made in our previous article regarding the selection of a donor, it is of value to know that the effect on the donor after giving a pint of blood, or more, is negligible. There may be a slight feeling of lassitude for the remainder of the day, but he will be entirely free of any effects the following day. Occasionally, nausea and vomiting follow the removal of large amounts of blood.

Individuals with a tendency toward tuberculosis should not offer themselves as donors. An instance was related to us by one of the hospital staff, where a nurse, after donating blood, developed actively progressing pulmonary tuberculosis and died.

DISCUSSION

The three main functions of transfused blood may be stated as follows: (1) to stimulate the bone marrow to produce new cells; (2) to furnish new cells which are capable of functioning, i. e., the erythrocytes of the donor; and (3) to provide bulk and sustain the blood volume.

In transfusions for simple hemorrhages the results are generally very good; for, in addition to the above functions, it helps to stop the bleeding by aiding coagulation; in many cases the hemorrhage stops promptly following transfusion. It has been found to be especially efficacious in duodenal ulcer hemorrhage where there is a constant oozing of blood.

The same results obtain in typhoid hemorrhages; and Ottenberg and Libman²⁴ state that in all cases of typhoid where blood has appeared

in the stools preparation should be made to do a transfusion if necessary. We had just recently a case of para-typhoid fever where the severe intestinal hemorrhage ceased after three transfusions. The citrate in the blood may be a factor in stopping the bleeding, as was shown by Weil.

In most cases of bleeding in hemophilia and purpura hemorrhagica where the cause is a deficiency of certain blood constituents, transfusions of blood act as a specific; and its early use has been the saver of many lives.

The hemorrhages which occur in purpura rheumatica, however, are not affected by transfusions, as the bleeding in these cases is not due to a deficiency of the necessary elements which bring about coagulation.

In blood diseases such as pernicious anemia and the leukemias transfusions often have a very striking effect, and may be the means of prolonging the patient's life for several years. It is with these cases that we have had most of our experience. In the series of twelve cases of pernicious anemia we have had good results, though temporary, in all but one.

Case No. I, who was practically in extremis on entrance, undoubtedly owes his remission to the transfusions which he received soon after admission. This case very likely would have died had he not been promptly transfused.

Case No. III, chronic myelogenous leukemia, had her life lengthened by several years as the result of transfusion; and it is altogether possible that her life could have been still further prolonged had they been continued after she left the hospital. The girl received remarkable symptomatic relief the day following her transfusions. Her pain over the liver, the headache and lassitude, would leave. This sense of comfort and well-being following transfusions in pernicious anemias and leukemias is rather common.

Although one frequently sees increases in hemoglobin of 50 to 60 per cent following transfusions in pernicious anemia, it is very difficult in most cases to find signs of new cell formation, i. e., nucleated cells, reticulated cells, etc. One of our cases on entrance showed large numbers of megaloblasts and reticulated cells, but had very little improvement following two transfusions. It is problematical as to whether or not

the bone marrow really is stimulated to produce new cells. If we should gauge the stimulation of bone marrow by the number of erythroblasts circulating in the blood stream, then the bone marrow response following transfusions is not very great.

In many cases the rise in percentage of hemoglobin and the increase in the number of red cells continue for a period as long as six months following transfusions. However, it must not be overlooked that remissions occur in cases which have not been transfused; and that the exact proportion of the remissions initiated by the transfusions can not be determined.

In only 16.4 per cent of our cases did reactions occur. Of these, only one reaction could be called at all severe; and in this case 10 to 15 c.c. of blood was injected from a donor whose blood group, on being rechecked, was found to be incompatible with that of the recipient. Immediately after injection the patient became very restless, his face flushed and cyanotic. He complained of a severe sense of constriction across his chest. The pulse and respiration became very rapid, and he broke out in a profuse sweat. About fifteen minutes later he developed a severe chill which lasted 15 to 20 minutes. The next day he showed hemoglobin-uria and an intense jaundice. This is a typical picture of a reaction as a result of wrong grouping. In this case we gave Group II blood to a Group III patient. This error has resulted in death in some cases, according to reports from the literature, although usually the patient recovers, as fortunately did this one.

The hemolysis in the case just cited was due, not to the agglutinins present, but as has been pointed out by many investigators, to a hemolysin which is frequently present in the same serum along with the agglutinin.

Another of our cases developed an urticarial rash all over his body, after two of his transfusions, although the blood was from different donors. The first time the rash appeared one hour after completion of transfusion, and disappeared four hours later. The second time it appeared during the transfusion, and lasted about 45 minutes.

Several of our cases showed no reaction other than a rise in temperature of from one to two degrees, lasting for several hours, and appear-

ing not before 11 to 24 hours after the transfusion.

The reactions following transfusions, as Novy and DeKruif have shown, are of the foreign protein type. The sodium citrate per se, therefore, can not be held responsible for the reactions since even toxic doses of this salt produce entirely different types of symptoms, such as convulsions, spasms, and nervous disturbances.

It is very rare that more than 900 c.c. of citrated blood is transfused. This amount contains 2.7 grams of the sodium citrate, which is much below the toxic dose. In our transfusions we average 1 to 1.5 grams of the salt, which is equivalent to about 30 to 40 milligrams per kilo of body weight, or one-half the toxic dose for cats.

Our percentage of reactions appears to be lower than those reported in the literature; and the reactions themselves on the whole, appear to be of the milder type. The reason for this we do not know; undoubtedly every worker uses the same precautions as we do: chemically pure sodium citrate, freshly distilled water, and careful blood groupings. Our apparatus has a minimum amount of rubber tubing, which may eliminate the tubing as a factor. In over 90 per cent of our cases we made no attempt to prevent reactions by administering morphine, adrenalin, hot drinks, or other remedies which are frequently used.

SUMMARY

Blood transfusions may be considered one of our very useful and very important therapeutic measures, and when properly used may be a means of prolonging and even saving life. It frequently gives considerable symptomatic relief, and this may add greatly to the comfort of the patient.

2. Although it is a procedure not requiring a great deal of skill, one must always use every precaution to avoid accidents and thus preclude any untoward results.

3. From the reports in the literature, and from our own experience blood transfusions are certainly no more dangerous and are followed by no greater discomfort than the injections of neosalvarsan.

4. Though deleterious results and even several deaths have been reported to have followed transfusions, these generally were attributable

to faulty judgment in the selection of cases, or to gross errors in the technique.

5. Our experience with citrated blood transfusions has been both gratifying and encouraging. We feel that the usefulness of this procedure is gradually enlarging with the increase in the simplicity of the technique.

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THE TREATMENT OF TUBERCULOSIS OF THE SPINE*

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Since the advent of active surgical treatment for tuberculosis of the spine about ten years ago, the literature has been full of reports and articles advocating some one of the several operative procedures used, especially the Albee and Hibbs operations; but very few have laid any stress on the benefits still to be derived from the older classical measures of the more conservative treatment. Although believing that both forms of treatment have their distinctive places in the handling of these cases, it has long seemed apparent to the author that the operative treatment has unjustly and unreasonably overshadowed the conservative and it is with the hope of establishing, in some slight measure at least, a better balance that this paper is written.

Like many new forms of treatment, especially if they consist of somewhat spectacular operations like the transplantation of a piece of tibia into the spine, the operative measures were rapidly accepted by a large number of surgeons, orthopedic and otherwise; and consequently many men who never would have thought of handling a case of spinal tuberculosis before, now tell how many cases they have operated upon. A knowledge of the underlying pathology was frequently lacking and the principles underlying all treatment were absolutely forgotten in the enthusiasm for operation; while the apparent fact that operative measures were not cures but merely new ways of applying the old principles was ignored. Many cases have been grossly neglected because of the faith of the ignorant in the operation alone. The universal application, then, of operative treatment must be condemned and the absolute necessity of the use of conservative measures in post-operative treatment strongly emphasized.

There is no diseased process occurring in the human body where the pathology more clearly

indicates the principles of treatment as does tuberculosis of the spine. This pathology is too well known to need any description here and we need only recall that the weight bearing part of the spinal column is involved and that without treatment this part caves in, the motion taking place at the interneural joints, and the typical kyphotic deformity or "hunch back" results.

The principles which underlie all local treatment are very evident. There must be removal of weight bearing and prevention of flexion of the spine; there must be fixation, which need not always be absolute (as will be seen later); and lastly any deformity or caving in which has already occurred must be prevented from increasing and, if possible, corrected. This latter point, the correction of the deformity, is frequently overlooked but unfortunately must be applied in the majority of cases, for examination of case-histories shows that about the most common symptom for which children are brought to the clinics for treatment is "lump in the back."

The principles of the general treatment and their application must not be overlooked, as they play a very important part in raising the resistance of the body to the point where the tuberculous infection can be overthrown and destroyed. Cure, as with any other tuberculous infection, can only take place in this way and local measures are only contributory factors. Chief of the general measures, aside from the usual fresh air, dietary and hygienic regime used in all tuberculous cases, is heliotherapy and no discussion of the treatment of tuberculous spondylitis would be complete without a short elucidation of this procedure. The principle is to build up the fighting powers of the body by carefully graduated exposures, so as to prevent burning, to the direct, unfiltered rays of the sun. The active rays are in the ultra-violet part of the spectrum and usually cause deep pigmentation of the skin. Apparently the resistance to the infection is in direct relation to this pigmentation for a patient who reacts quickly to the exposure and tans and pigments heavily can be given a much better and shorter prognosis than one who does not react so strongly. One frequently sees, for

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example, cases with multiple discharging sinuses whose resistance is very low and where it seems impossible to get more than a very faint degree of pigmentation, even after many months, until suddenly the condition changes for the better and deep tanning then occurs.

In a climate such as we have in Minnesota it is impossible to use heliotherapy for more than a few months in the summer although with proper arrangements it can be prolonged much more than would at first seem possible. The direct rays of the sun are very warm even in winter and if a patient can be protected from the wind, exposure of the body is possible even when the temperature is fairly low. Of course, except during the very warm weather, there must be absolutely no exposure except in the direct rays of the sun. The artificial-sunlight or quartz lamp can be used as a very satisfactory substitute for sunlight in bad weather or when the temperature is low. Care must be taken not to burn the patient, however, as the rays are very powerful, but any intelligent attendant can soon learn to apply it proficiently.

Other general measures in use besides the heliotherapy are, tuberculin therapy, the roentgen ray, and numerous forms of special lights devised to act as local sterilizing agents and in the same manner as sunlight. Of these measures the use of the roentgen ray seems to be the only one of established value and there is no doubt that the more universal use of this therapeutic agent would hasten the recovery of many cases who have been suffering for months or years from discharging sinuses.

The local treatment, the principles of which have been already mentioned, must not be ignored while applying the above general measures but must be rigidly applied from the first. This treatment varies with different cases and should be more radical in adults than in children. Children can be cured by conservative measures and the function of the spine in many of these cases not permanently interfered with. That is, there is a complete and absolute cure. This is not the case with adults where there is always a definite decrease in the function of the spine with ankylosis between a certain number of the vertebrae even in the cured cases.

What then is the treatment recommended for tuberculosis of the spine in children? Very emphatically not operative, but, with few exceptions, strictly conservative. If we remember the general principles, the particular type of apparatus to be used in this treatment can be chosen from a long list of very efficient methods all of which are very satisfactory if properly used. As with any other established method in surgery the wrong application or adjustment reacts not against the method but against the surgeon applying it and if a case does badly with a classical type of treatment it is necessary to investigate how that treatment is being applied.

There are certain methods which have been found to be most satisfactory and these it is desired to describe more in detail but with the understanding that all the other methods are not condemned thereby. In the first place all acute and subacute cases should be treated in absolute recumbency, preferably on a gas-pipe frame. This frame is made of galvanized gas-pipe and should be from four to six inches longer than the patient and just the width of the shoulder joints or about four-fifths the width of the body. The importance of this last measurement is frequently overlooked and the result is a wide frame upon which it is impossible to keep the patient properly. The shoulders should overhang the side bars of the frame. The bare frame is covered with a heavy canvas which is drawn tight by means of a lacing on the reverse side and the area of the deformity is protected from undue pressure by sewing two felt strips onto the canvas in such a manner that the spinous processes will rest between them. A piece of rubber sheeting is placed over the center of the frame to protect the canvas from soiling and the whole can then be covered by a small sheet. The child is placed on its back on the frame and is held in that position by one or more aprons or retaining straps which fasten around the frame and the body. Frequently in order to be sure that the patient does not lift himself from the frame a special apron with arm-holes is used over the upper part of the body.

After the child has become accustomed to the new condition, and it is surprising how

quickly most children accommodate themselves to this fixation, the frame is bent backward so as to apply a hyper-extending force to the spine in addition to that of gravity and gradually in this way, if the apex of the bend is at the point of deformity, the kyphosis will flatten out. The diseased and crushed bodies will separate and eventually a reversal of the deformity may be obtained, the spine assuming the position of a long-rounded lordosis. Cases with very acute and severe symptoms or those with paraplegia, especially if the disease is situated high up in the spinal column, will frequently need additional treatment for a time consisting of direct head traction by means of the weight and pulley. Counter fixation must of course be used to prevent the patient from being pulled off of the frame.

With the application of a properly fitted and prepared frame the symptoms of spinal disease subside almost immediately and a pitiful, suffering child will in a very few days be bright and cheerful.

The routine care of patients undergoing the above treatment is very important and nurses and parents must be carefully instructed in their management. Daily, without fail, the child must be taken from the frame and the back cleaned and rubbed with alcohol. In order to prevent any flexion of the spine the child is removed by turning the frame over so that he is lying on his abdomen on the bed, the aprons or retaining straps having first been loosened. If possible, another frame should be in readiness so that the old frame need not immediately be cleaned up. This is of especial value in an institution as much time can be saved by this method.

As the cure progresses the child can be allowed to spend several hours a day lying on its abdomen, there being no attempt made to keep the spine absolutely rigid, flexion only being prevented. A gas-pipe frame with the curve reversed has been found of value here and it can readily be seen that the prone position on such an apparatus is very ideal. Further hyperextension of the spine can take place and by raising on his elbows the patient can augment the forces tending to decrease the de-

formity. This far from being injurious, has apparently been of great value in many cases.

After from six to eighteen months, depending on the duration and severity of the case and the number of vertebrae involved, it is time to very gradually commence ambulatory treatment. Here again as with the recumbent treatment, there are many types of apparatus to be used, probably the most efficient being a plaster of Paris jacket of the Calot type, that is, a jacket which, even with low lumbar disease extends over the shoulders and around the neck. With disease higher up the chin and occiput or even the entire head must be included in the plaster. These jackets may be used from the very beginning of the treatment in place of the gas-pipe frame if desired and with a very large pear-shaped window cut out over the chest and abdomen anteriorly and a small rectangular window over the deformity posteriorly, this deformity can be markedly helped. This is accomplished by forcing into the posterior window a large pad of sheet-wadding and holding it firm by means of a bandage. The pad is removed and increased in thickness as needed. If the deformity has been cured or further correction is impossible the smaller window is not cut, but the anterior opening must be provided in all cases.

A brace of the general type of the Taylor brace can be used if desired for this convalescent treatment instead of the plaster packets, but the main objections to it are the constant adjustments which must be made and which can only be carried out properly in the majority of cases in a hospital. If the patient is to be at home the advantages of a jacket are obvious.

Ambulatory treatment must be started very gradually, several weeks being allowed to elapse from the time the first deviation from the recumbent position is permitted until the patient is finally walking around. The muscles are very weak and the vital organs are unused to the vertical position so it is only by proceeding step by step that the child is finally entirely freed from the effects of the long recumbency.

There now must elapse another long period before cure can be realized. The minimum total time for active treatment must be about

three years, unless the case was an old one before coming under observation, and thus this ambulatory treatment must last for many months. The jacket must be changed at intervals and toward the end may be replaced by a removable jacket or back brace. When cure is apparently complete the brace or apparatus being worn can be removed at night and used only during the day and then later it is also gradually removed for increasing lengths of time during the day. Cure can only be finally ascertained by a long trial period without support, substantiated by the radiographic evidence.

Occasionally one may find a case of tuberculosis of the spine in childhood which, on account of some particular circumstances, such as inability to control and obtain proper fixation by conservative means due to lack of cooperation by the patient or its parents, may call for operative treatment. The question of the type of operation then arises. It must be repeated that no new principle is followed in using operative measures but that these measures aim either to splint the spine internally, as by the bone graft method or Albee, or to cause a fusion of the spinal arches and processes as by the method of Hibbs. The consensus of opinion seems to favor the insertion of a graft into the split spinous processes rather than the more difficult and less immediately satisfactory fusion operation. Calve's new method of placing a short graft between the spinous processes of the diseased vertebrae only, would appear to be theoretically correct as it has for its object the blocking of the lesion without interfering with any correction of the deformity which the conservative measures may obtain. The operation is too new to have been thoroughly tried out however.

If an operation is performed it must be followed by active conservative treatment and at no time must this be forgotten. None of the operative measures are sufficient in themselves, although much has been claimed in this regard, and the bad results one is constantly seeing in the clinics following the radical measures are due largely to a blind faith, both on the part of the surgeon and the family, in a small graft

of bone which has been incapable alone of resisting the action of the body weight.

The question of treatment in adult tuberculosis of the spine now remains, and here operative measures for all cases is recommended with certain definite restrictions. As complete spinal function never returns in an adult the operative fixation can do good only; if undertaken too soon, however, a certain amount of correction of the deformity is prevented and the result, although usually satisfactory so far as the disease itself is concerned, not so excellent as it might otherwise have been. Conservative measures are strongly indicated therefore, until such correction of the kyphosis as seems possible is obtained and then the radical therapy can be instituted. Here again the post-operative treatment must be emphasized and a rigid and prolonged application of conservative methods insisted upon. The time which must pass before cure takes place is probably much longer than with children and the late after treatment must not be hurried.

In spite of the best of treatment some cases of spinal tuberculosis will not react properly and will finally die of one of the graver complications. There are many deaths however which are preventable, and the larger part of these are resultant on the mixed infection which follows the improper treatment of tuberculosis abscesses. These abscesses are therefore a most important complication and their handling should be thoroughly understood. The great danger being mixed infection, no abscess should be opened unless causing trouble by its presence. Size is no criterion and it is only when there is pain due to its presence or a possibility of spontaneous rupture that interference is indicated. Many abscesses will disappear spontaneously and need no direct attention but if evacuation becomes necessary aspiration should always be used, open incision being absolutely contraindicated. By aspiration mixed infection is prevented, for the track of the needle heals by first intention and the chronic discharging sinus is thus obviated.

The only other complication of importance from a therapeutic standpoint is paraplegia and nothing but conservative handling is ever indicated here. A small number of cases is due

to actual destruction of the cord and of course laminectomy can be of no avail; but in by far the greater number the lesion is only temporary and will clear up as the disease itself subsides. Operative decompression is not indicated at any time.

Tuberculosis of the spine is therefore a disease of which the therapy, both of itself and its complications, is decidedly conservative. Operative measures are certainly indicated at times but never can the fundamental principles of treatment be replaced by radical measures.

To sum up;

1. The treatment of tuberculosis of the spine in children should be routinely conservative, operative therapy being only occasionally indicated.

2. The treatment in adults should be more radical.

3. Operative measures are merely complementary to and do not replace the older classical methods of treatment, the underlying principles remaining always the same.

4. The actual tuberculosis infection remains for many months or years in the vertebrae and it is probable that the operative fixation of the spine does not hasten its elimination more than the proper conservative methods.

DISCUSSION

DR. J. R. KUTH, Duluth: The doctor has very completely reviewed the subject under discussion and has properly expressed a conservative position in the treatment of these cases. The one essential factor in the treatment of cases of tuberculosis of the spine is time. It is best to think not in terms of months but rather in terms of years. It is for this reason that these patients ought to be kept under observation for a long time and their life and later activities regulated and governed by the best possible conditions. We know that a tuberculous infection may remain latent for years and may recrudescence at any period.

Regarding the correction of deformity, the doctor has very properly urged caution. We know that bone destroyed by tuberculosis is seldom or rarely replaced and deformity inevitably results. It is therefore best to accept deformity, and it is quite probable that any improvement of the deformity brought about by treatment is rather accomplished at the expense of the section of the spine above and below the lesion. A warning should be sounded against the forcible correction of these deformities. Recovery with movement in a tuberculous joint in general

probably is a rare occurrence. Heliotherapy probably gives the best chance to obtain such a recovery.

It is a debatable question I believe whether it is advisable to strive for movable joints as a rule. Personally, if I had a tuberculous knee or tuberculous hip or a tuberculous spine, I would feel much safer with that segment or joint firmly ankylosed. I believe it is much more certain to add to the permanency of the cure.

Towards the latter part of the paper the doctor accentuated the importance of not draining tuberculous accumulations of pus. That is a warning that has been sounded repeatedly in the literature, but it is not at all uncommon to see cases with large incision made into these pus accumulation. In many cases the size and number of incisions is regulated by the size of the former accumulation. This is a distinct disadvantage. While we frequently see it, it lessens the chances of the patient so far as recovery is concerned.

Some years ago I had a slight experience with the x-ray treatment of tuberculous joints. It is possible that those cases which are synovial in type may be benefited somewhat by x-ray treatment, but it is difficult I believe to obtain much improvement in the osseous type which are of course by far the most frequent.

The sunlight treatment is probably one of our best, as well as our latest, methods. We are using it, and I believe it can be used in colder climates by beginning in early spring and continuing until late in the fall. I have seen more marked local improvement in surgical tuberculosis from this one aid than from any other.

DR. EMIL S. GEIST, Minneapolis: I want to compliment Dr. Cole on his lucid, brief and modern display of the most recent treatment of tuberculosis of the spine. I consider tuberculosis of the spine in the adult quite different from that in the child. We all know that in the adult the surgical treatment is the treatment par excellence. In my own work it has been a long time since I operated on a child, that is, a child under sixteen or eighteen years of age, for tuberculosis of the spine.

The diagnosis of tuberculosis of the spine in the child is different than in the adult. As a rule, in the child the diagnosis is easy and very difficult in the adult. An article was published by Cabot some years ago on the diagnoses made in cases at the Massachusetts General Hospital, which were checked up by postmortem examinations later. Among a large number of diseases missed by the diagnosticians, the second in order was tuberculosis of the adult spine. I believe I have more cases of tuberculosis of the spine to deal with in adults than in children. The condition is not infrequent.

Operation, in children, as I said before, is almost entirely to be ruled out. The graft is absent after a year: absorbed. So far as adults are concerned, the

operation is to be advised if the patients are good operative risks. The American Orthopedic Association Commission collected a large number of operated cases, and reported them a month or two ago in Boston. The general trend of the report was in favor of operative procedures in properly selected cases in adults.

DR. M. S. HENDERSON, Rochester: I wish also to compliment Dr. Cole on his comprehensive discussion of this subject. I cannot add very much to what he has said, but I would like to emphasize one or two points.

There is a big difference between tuberculosis of the spine in children and in adults, and I think we all agree with Dr. Cole that conservative measures are the ones to follow out in children. There are many reports of operative work in recent years, and I think we can interpret them as not being very good in children. In adults my impression is that the results are better than by the conservative methods.

I did not hear Dr. Cole mention tuberculosis of the spine following the acute diseases, and I would like to ask whether in his experience he has noticed tuberculosis of the spine in children following the influenza. We have seen quite a number of cases in adults.

I might add to the discussion a report of a study I made last winter. At that time I reviewed all of our cases operated on in the last nine years by the Taylor-Hibbs method. The paper has not yet been published. We found we had some 160 odd cases and these cases had all been operated on for a year or eighteen months before I made my review of the work. There were 50 per cent of cures, the patients being able to go back to work and take their places in civil life. Ten per cent died later from disseminated tuberculosis, some of meningitis, some of miliary tuberculosis, and some of generalized tuberculosis. Only ten or eleven children were operated on, and the majority of these cases were failures. Judging from these results we feel that we should continue to operate on adults but not operate on children.

DR. L. E. DOOLITTLE, Duluth: There is only one point I would like to mention in Dr. Cole's paper, and that is in regard to braces. Dr. Cole said it was hard

to keep the back fixed with braces and that a plaster jacket was the best way to carry out the preliminary treatment. There is a brace that has been used quite a bit which I have not seen anywhere around here. It seems to me so much better than the old type of Taylor brace that I would like to draw it for you on the board and to give you an idea of what can be done with this particular type of brace.

The old Taylor brace had a single bar around the pelvis with two bands at the back. You get fixation and hyperextension. The Taylor brace slipped up and down on the pelvis. This other brace starts like this (illustrating) with two bars opposite the spine, with a band around this way (indicating), and another bar which encircles the crest of the ilium around the anterior superior spine and fastens to this bar in here, and then there is a bar up here (indicating). There are straps which go up around the shoulder to produce hyperextension. This particular type of brace fits snugly over the crest of the ilium and you have absolute fixation. The brace fits over the pelvis and you can get any degree of hyperextension you wish. It is the most efficient type of brace I have ever seen.

Dr. Bennett, of Baltimore, is responsible for this particular combination. It is a combination and has no particular name so far as I know.

DR. WALLACE H. COLE, St. Paul (closing): I have very little more to add to what I have already said. Answering Dr. Henderson, we have seen cases in children following influenza. I have seen half a dozen cases in ex-soldiers who had influenza in the army and had painful backs develop into definite tuberculosis of the spine. I recall one case the history of which may be interesting to you. A soldier, who developed symptoms of tuberculosis of the spine, was sent to the hospital and developed paraplegia within a day or two, and although a long graft was put into the spine with complete fixation, and he was absolutely immobilized for nine months, he developed an acute miliary tuberculosis with meningeal symptoms and died. Autopsy showed the graft was absolutely solid. In spite of absolute fixation he developed an acute miliary tuberculosis. With the best of fixation we do not always get a cure.

THE TREATMENT OF PERICARDITIS WITH EFFUSION*

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Pericarditis is an inflammation of the serous layer of the pericardium. The inflammatory process, however, often extends outward through the whole thickness of the pericardium, involving adjacent structures, and inward into the musculature of the heart.

Inflammatory exudation presupposes infection which, with rare exceptions, is probably always present. A hemorrhagic effusion may be due to malignant disease. Pericarditis has been observed following the injection of diphtheria antitoxin (Cunnington), and recently a case of hemorrhagic pericardial effusion following arsphenamin injection, but probably due to malignancy, has been observed in the Mayo Clinic. Wachter, Vergely, and others have reported cases of syphilitic pericarditis.

The older writers recognized primary idiopathic pericarditis following chill or trauma, a condition analogous to the so-called primary idiopathic pleuritis with effusion. It is now quite generally accepted, however, that in the great majority of instances this type of pleurisy is tuberculous. McPhedran believes that a considerable proportion of cases of plastic pericarditis are tuberculous. It seems probable that also many of the cases of pericarditis with effusion are tuberculous.

The occurrence of a tuberculous pericarditis when there is no tuberculous focus elsewhere, pulmonary, pleural, or glandular, has been questioned, and by some writers categorically denied. To vouch for the occurrence of such a primary lesion, however, is no less an authority than Virchow, who describes a case in detail in which careful search at necropsy failed to demonstrate any lesion whatsoever outside the pericardium. Similar cases have been reported by Thym, Meltzer, Scagliosi, Jahn, and Fromberg.

The most frequent cause of primary pericarditis is probably the infective organism of acute

articular rheumatism, which in such cases attacks the serous layer of the pericardium rather than that of a joint. Cases have been observed in which a friction rub was the first sign of an acute articular polyarthritides.

Pericarditis is usually secondary to a disease process elsewhere. Acute articular rheumatism is the most frequent primary disease entity. Pleurisy, pneumonia, the acute general infections, tuberculosis, and syphilis represent the less frequent associated disease conditions. In a series of 100 cases at the Boston City Hospital during fourteen years Sears found the pericarditis associated with acute rheumatism in fifty-one, with pneumonia and pneumococcus infection elsewhere in eighteen, chronic nephritis in seven, pleurisy in five, gonorrhea in two, chronic rheumatism in two, and in one case each with empyema, tonsillar abscess, acute nephritis, hepatic cirrhosis, and chronic fibrous pneumonia. Nine cases were classified as idiopathic. ✓

In young children and infants suppurative pericarditis seems to be largely a complication of pleurisy and pneumonia. Of 100 cases reported by Poynton sixty occurred in association with empyema and forty with pneumonia.

Clinically pericarditis with effusion is usually classified as serous, hemorrhagic, or purulent, or as combinations of these types of exudates. In Sears' series "fifty-four were dry, forty-one serous, four hemorrhagic, and five purulent." Of 100 cases that have come to necropsy at the Mayo Clinic since 1910, twenty-three were acute fibrous, twenty adhesive or obliterative, twenty-seven serous, twenty-one purulent, and four hemorrhagic. This classification, however, has no etiologic basis. In rheumatism the exudate is usually serous, but may be hemorrhagic or purulent. The effusion is most liable to be purulent in association with suppurative pulmonary and pleural processes, especially those due to the epidemic type of streptococcus infection. McPhedran states that a purulent effusion is usually such from the onset. Hemorrhagic effusions are especially frequent in association with purpura, scorbutus, and malignant disease, but also with tuberculosis, nephritis, and the cachectic states.

DIAGNOSIS

Diagnosis is of prime importance in any con-

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sideration of pericarditis. McPhedran states that no acute disease is so frequently overlooked. An adequate discussion of the diagnosis is beyond the scope of this paper. In general it may be said that diagnosis of the presence of a pericardial effusion is based on finding a pericardial friction rub, which may or may not disappear, increased precordial dullness, and enlarged heart shadow on roentgen-ray examination, feeble or absent heart sounds, absent apex impulse, small rapid pulse; dyspnea, and cyanosis. Occasional signs are dysphagia, precordial pain, pulsus paradoxus, and recurrent nerve paralysis. Downward displacement of the liver and dullness in the left side of the back may also be found. The differential diagnosis is essentially between pericarditis with effusion and cardiac dilatation.

SURGICAL TREATMENT

The principles of the surgical treatment have been developed through the cumulative experience of many surgeons. No large series of original cases has been reported. The relatively small individual surgical experience is pointed out by Kolb. He states that at the Heidelberg Cline from 1897 to 1911 30,050 operations were performed. Among these were one pericardiocentesis, four pericardiotomies, and four cases of cardiolysis. Whittemore writes that the records of the Massachusetts General Hospital contain the histories of only two operations for purulent pericarditis.

From the standpoint of surgical treatment the important consideration is the presence or absence of living pyogenic or tuberculosis bacilli in the exudate. What the specific infective organism may be, whether the streptococcus, staphylococcus, pneumococcus, Friedlander's bacillus, *B. coli*, *B. pyocyaneus*, or the gonococcus, is of significance chiefly with reference to prognosis. The treatment is drainage. A sterile or tuberculous exudate in general may require evacuation, but never by open drainage.

Pericardiocentesis.—Pericardiocentesis is indicated in all cases of suspected effusion in order to establish the diagnosis and to evacuate a sterile exudate in case it is causing embarrassment to the circulation. As a diagnostic procedure it may serve both to establish the pres-

ence of fluid and to determine its nature. Negative aspiration, however, does not exclude the presence of an effusion, as emphasized by Jacob³⁶. A purulent exudate in the presence of fever, leukocytosis, and other findings characteristic of a suppurative process may be assumed without further investigation to be infected, and open drainage should be instituted at once. If the symptoms pointing to a pyogenic infection are less definite and the fluid proves to be turbid, a culture or direct examination may be necessary in order to establish the presence of living pyogenic organisms. Rarely a tuberculous effusion is frankly purulent and may occur with fever, night sweats, and so forth, suggesting a pyogenic origin. In such cases a sterile culture and a predominance of lymphocytes in a stained smear justify a tentative diagnosis of tuberculous pericarditis; open drainage would almost certainly lead to a secondary pyogenic infection and greatly lessen the patient's chances for recovery.

In cases with large effusion and in many cases with signs of only a very moderate effusion, symptoms of dyspnea, cyanosis, feeble pulse, distention of the veins in the neck, coldness of the extremities, edema, and in some cases, marked pain, are associated. Some writers attribute these symptoms to cardiac weakness and not to the mechanical effect of the pericardial fluid. McPhedran believes "the danger from pericarditis is rarely due to the inflammation of the serous membrane itself, but first to the presence of the accumulated effusion hampering the action of the heart, only an occasional danger, and secondly and chiefly, to the occurrence of inflammation in the walls of the heart itself." That the symptoms in these cases may be largely due to increased intrapericardial pressure is, however, abundantly appreciated by anyone who has seen the immediate relief from pericardiocentesis to a practically moribund patient. In such cases it is life saving.

The reason why a large pericardial exudate or even a rapidly accumulated smaller one may seriously embarrass the return of the blood to the heart becomes clear when it is considered that normally the negative intrathoracic pressure of from 0.3 to 30 mm. mercury (Starling) is transmitted through the pericardium, so that the in-

trapericardial pressure is normally -3 to -5 mm. mercury (Adamkiewitseh and Jacobson). In the presence of a pericardial exudate, owing to the rigid pericardial walls limiting the pressure on the lungs, the intrapleural pressure usually remains but slightly if at all affected. Inside the pericardium, however, I have found that the pressure varied in one case between 6 and 20 cm. of water. A few such observations are also recorded in the literature. Reichard has recorded a pressure of 15 cm. water, Gerhardt, 24 cm., and Haussen 17 cm. In one of Gluck's cases 250 c. c. of blood sufficed to "strangulate" the heart.

Experimentally it has also been shown by Francois-Franck, Lagrolet, Kuno, and others that in animals a relatively small amount of fluid in the pericardium causes a diminution in the output from the heart, resulting in increased pulse rate. Further increase in pressure causes a fall in blood pressure. Finally, when the intracardial pressure reaches the pressure in the venae cavae and auricles the heart stops. A striking analogy is found in the increased pulse rate, lowered pulse volume, and blood pressure and increasing dyspnea and cyanosis in cases of large rapidly accumulating pericardial effusion.

The site for pericardiocentesis.—There have been much discussion and diversity of opinion on the proper site for pericardiocentesis. Doeberth objects that in textbooks sufficient consideration to the subject is not given; in many it is not even mentioned. It is of practical importance chiefly, perhaps, with reference to finding the bulk of exudate in case aspiration of the fluid is attempted therapeutically, and because of the danger of wounding the heart or mammary vessels and the risk of infecting the pleural cavity if a pyogenic bacterial exudate is present and the puncture is made through the pleura.

The position of the heart in the presence of an exudate is of first importance because of the chance of injuring it and the location of the exudate. The old conception first expressed by Scoda and later by many others (Niemeyer, Schrotter, Potain, Trousseau,) was that the heart, being of greater specific gravity than the exudate, sinks backward when the patient lies in the dorsal position. According to this con-

ception there would scarcely be any danger of injury to the heart in the presence of a large exudate by inserting the needle near the sternal edge where the pleura and the mammary vessels are avoided; nor would there be any failure to aspirate the exudate. Clinical experience has shown, however, that it may be impossible to obtain fluid by aspirating at the sternal edge even in the presence of a large exudate, and often the heart has been punctured and blood aspirated, in a few recorded cases with fatal results (Mignon, Calander, Baizeau, Southey, and others). Gluck believes that puncture of the heart may be dangerous in the presence of a degenerated heart and says he has observed two fatal cases. Delorme and Mignon and Frankel believe that the chief danger is wounding the large dilated coronary vein lying in the left longitudinal sinus.

The failure to obtain fluid and the occasional accidental puncture of the heart during aspiration suggested an anterior position of the heart and led to experimentation on the cadaver to determine its position, after injection with plaster of Paris, cocoa butter, gelatin, agar, and so forth, into the pericardial cavity. Such experiments were performed by Goodle, Ferrand, Rotch, Schaposchnikoff, and Damsch, and recently by Williamson. It was found that the heart does not drop back, even when the specific gravity of the fluid is less than that of the pericardial exudate, but that the bulk of the infected material lies below, laterally and posterior to the heart. In some instances there is a thin layer of fluid in front of the heart, in others none. The same findings were noted by Rehm at necropsy in a fatal case of hemopericardium. Gluck writes that the heart lies anteriorly like the patella. He cites a case in which even after pericardiotomy no exudate was obtained until the finger was inserted laterally between the heart and the pericardium. Curschmann points out that the backward dislocation of the heart against the posterior chest wall is impossible on account of its fixation through the great vessels. It must be borne in mind, however, that the anatomic relations may be distorted by a large effusion. Meyer has recorded a case in which the heart at pericardiotomy lay beyond reach of the finger. Frankel and Brentano⁸ also have

noted at operation that the heart lies anteriorly. I have also felt the heart beat against the needle in a number of cases; in one such case after evacuation of the fluid the heart could scarcely be reached by the examining finger.

The experiments cited above also bear out the clinical observations that the bulk of the fluid accessible to aspiration usually lies below or to the left, but may be on the right of the heart.

The internal mammary vessels are said to lie from 0.5 to 2 cm. from the sternal border (Gray, Piersol, Delorme and Mignon).

In spite of these observations there is a diversity of opinion on the most suitable position for aspiration. Some surgeons consider the danger of injury to the heart, others the danger of contaminating the pleura, to be the greatest evil. Kocher⁴⁰, Strumpell, and Delorme and Mignon, recommend aspiration of the sternal edge, Dieulafoy 6 cm. outside the sternal edge, that is outside the mammary vessels, and Gluck and West outside the mammary line; Curschmann and Damsch state that the aspiration should be performed at the point where the findings indicate the greatest amount of fluid. Frankel has reported two cases, Schaposchnikoff four cases, and Doeberst one case, in which aspiration to the right of the sternum was successful (Roberts). Roberts and Marfan advise aspiration in the costoxiphoid angle. Hoffman advises aspiration from behind in certain cases, piercing the lung. Others, among them Lundmark, Brentano⁹, Mose, Strumpell, Gluck Sjøvall, and Tallqvist, express a preference for a primary pericardiotomy as being less dangerous and more certain of securing adequate evacuation. Kolb believes that in case of negative aspiration open operation is indicated. Souligoux reserves aspiration for hydropericardium.

The great variation of opinion as to the proper site for puncture seems to indicate that all sites have their shortcomings. Rehn remarks that the more numerous the methods, the more sparingly should any of them be used. A very important consideration and one which has a bearing on the whole question is the technic and the needle used for the aspiration. If a large needle or a trocar is used, as seems to have been the rule, it is a matter of considerable importance where and how many times it is inserted.

The injury to the heart and mammary vessels may be of grave consequence, and the chances of contamination of the pleura may be considerable. The introduction of the needle without good regional anesthesia is an ordeal for a sick patient. If, on the other hand, a short hypodermic needle is used following local anesthesia, the procedure becomes practically painless and harmless, so that if fluid is not obtained at the point where it would seem most likely to be, further exploration can be done. I have repeatedly aspirated several hundred cubic centimeters of exudate, serous, hemorrhagic and frankly purulent, through a hypodermic needle 4.5 cm. long without the slightest ill effect on the patient. I have also felt the heart beat against the needle in cases with effusion and in cases without effusion, and in one instance aspirated blood, apparently from the auricle, without the least effect on the patient. I submit this technic as one in which the chance of serious harm is negligible, compared with the advantage of a positive proof of pericardial effusion.

Many surgeons caution against too rapid withdrawal of a large effusion. Curschmann employs gravity aspiration. According to his views aspiration evacuates the fluid too rapidly and may produce shock and cardiac collapse. Kolb and Kuttner also recommend very gradual evacuation, and advise against aspiration. Others, on the contrary, use some form of aspiration. On *a priori* grounds it seems illogical to fear bad results from too rapid evacuation in cases of serous effusion, which is usually treated by aspiration, when purulent exudates, with which probably a greatly more frequent and severe myocardial weakness is associated, are drained by wide incision in the pericardium. On two occasions I have emptied an exudation of about 2 liters, in one case by aspiration, in the other by open incision with the patient under local anesthesia, and with frequent observation of the blood pressure and pulse rate. At no time was there the slightest indication of an untoward effect. In other cases the fluid has been aspirated with a 20 cc. syringe without any untoward symptoms attributable to the aspiration.

The question of repeated aspirations arises in case of reaccumulation of a sterile exudate. In most cases the effusion ceases and the remaining

exudate is absorbed after varying intervals, due, according to McPhedran to a restoration of the permeability of the vessels. In some cases, however, notably in tuberculous and hemorrhagic pericarditis, the effusion reaccumulates. McPhedran cites a case in which aspiration was performed thirteen times, but the patient died. In one case at the Mayo Clinic on the service of Dr. Willus I aspirated a hemorrhagic effusion thirteen times. In another case, tuberculous pericarditis, aspiration had been performed three times elsewhere.

In these cases of recurrent effusion injection of air into the pericardium and also open drainage have been advocated. Wenckebach and Weil and Loiseleur report cases cured by this treatment. Alexander recommends air injection to prevent adhesive pericarditis.

Pericardiotomy.—Pericardiotomy with drainage is indicated in cases of non tuberculous purulent effusion. It was demonstrated very early that aspiration is absolutely inefficient. In the nine cases reported before 1889 in which the treatment was aspiration all the patients died (Fevrier). The operation is also indicated to establish the diagnosis in cases in which exploratory aspiration has failed, but if the needle is inserted laterally, on both sides if necessary, or if insertion there fails, enough fluid will probably nearly always be obtained from below to establish the diagnosis. Pericardiotomy is also urgently indicated in cases with large effusion embarrassing the heart in which aspiration fails to evacuate a sufficient amount of fluid to relieve the pressure. There may be trabeculated cavitations in such cases. The open operation has been advocated as a primary procedure also for sterile serous exudates, notably by Kuttner, Lundmark, Rochard, and others. Rochard writes that precardiac puncture is diagnostically untrustworthy, dangerous, and therapeutically inefficient.

Pericardiotomy with drainage would seem always to be a questionable procedure in cases of sterile exudation, even though purulent, as in the case of tuberculous effusion, on account of the probability of infection. It has been argued that in cases of tuberculous effusion open operation with closure might result in an improvement similar to that following laparotomy for tuber-

culous peritonitis. That in such cases open drainage is followed by unfavorable results, however, as it is following laparotomy for tuberculous peritonitis, is indicated by the fact that recovery was reported in only one of the cases collected by Berteaux. Favorable results following drainage of sterile effusions have been reported, however, by Meyer and by Dowd. Pericardiotomy without drainage performed at the Mayo Clinic in one case with 2000 cc. of tuberculous exudate was followed by marked general improvement, but gradual reaccumulation of the exudate. At a second pericardiotomy in this case drainage into the subcutaneous tissues was attempted after the method described by Jacob⁵⁸. Sufficient time has not elapsed in this case to determine the ultimate results but the indications are favorable.

The technic of pericardiotomy.—In selecting the site for incision and drainage the choice is distinctly more limited than for pericardiocentesis. These limitations are the reflections of the pleurae, the anterior edges of the lungs, and the sternum. The pleural reflections are parallel and run close together behind the sternum from the level of the first rib to about the level of the fourth; the left pleural reflection then deviates somewhat and in variable amounts to the left, leaving a small area behind the fifth, sixth, and seventh ribs bare of pleura. The average point of crossing measured from the sternal edge, according to Luschka, is 1.5 cm. at the fifth rib, 2 cm. at the sixth, and 2.5 cm. at the seventh. Considerable anatomic variations occur, however; Lundmark, in a study of twenty cadavers, found that the pleural reflections in three continued parallel all the way down, in one behind the sternum, in one behind the right sternal edge, and in another behind the left sternal edge. Sick, studying the pleural relations in twenty-three adults, found that the pleural reflection at the level of the cartilage of the fifth rib lay at or within the left border of the sternum in seventeen; at the level of the sixth cartilage the pleural border had not gone beyond the sternal border in ten; at the level of the sternal articulation of the seventh cartilage it was at the sternal border in nine or this cartilage was below its lower border. In eight of twelve children the pleural reflection was at the sternal border at the

level of the sixth cartilage. Dwight, Delorme and Mignon, and others, essentially agree. Rehn attributes many deaths to opening the pleura. He believes that the ideal method is to operate in a differential pressure chamber. In the presence of pleural effusion the tendency is, however, for the lungs to be crowded back, and in the presence of a purulent exudation the Pleural surfaces are probably usually adherent, effectively walling off the pleural cavity. In pericardiotomy the mammary vessels may either be retracted outward or ligated and cut.

Except perhaps in children the operation should be performed under local anesthesia; it is important to remember that anteriorly the intercostal nerves run midway between the cartilages. The pericardium does not appear especially sensitive. On five occasions while operating under local anesthesia without infiltration of the pericardium I have incised it. Harrigan reports a case, however, in which the heart stopped beating when the pericardium was incised with the patient under ether oxygen anesthesia. Heitler and d'Agata, on an experimental basis, recommend cocaineizing the pericardium before incising it. Patients who are dyspneic and especially if cyanosed and with a rapid, weak pulse, should be operated on in bed, and every effort made to minimize their discomfort and excitement.

Numerous variations in the type of incision and the position and number of cartilages or ribs resected have been described and recommended. Reichard resects the third and fourth cartilages, Ollier, Gussenbauer³¹, and Durand the fifth. Axhausen, Kocher⁴¹, Pels-Leusden, the sixth, Delorme and Mignon the fifth and sixth, Lorey, Mintz, and Rehn the seventh. Berard and Pehu have devised a transxiphisternal route, dissecting the sternum from the diaphragm. Roberts proposed an osteoplastic flap, and Gluck resects the fifth and sixth ribs laterally. Romberg advises rib resection and drainage to the right of the sternum in cases in which the exudate lies to the right. In my experience, resection of the fifth and sixth cartilages has given adequate and dependent drainage. I have found knife section of the cartilage to be less hazardous to the underlying structures than the use of forceps. Von Eiselsberg, Brentano, and Gussen-

bauer³² suture the pericardium to the muscle or wound edges in order to protect the pleura. The important considerations in the approach are to avoid opening the pleural cavity and to secure dependent drainage.

The matter of efficient drainage is one of the greatest importance. The presence of recesses in the pericardial cavity on either side of the venae cavae behind the heart, into which the exudate gravitates with the patient in a dorsal position, is the worst possible combination for drainage. When it is further considered that the heart tends to assume a forward position, as I have repeatedly observed, and to form adhesions anteriorly, it is easy to understand how the pus may be encapsulated behind it. Many patients who do well for a time, but who die later, probably succumb because of failure to maintain adequate drainage of these most dependent parts. Kolb and Rehn recommend long tube drainage, one tube passing behind the heart to the right over the inferior vena cava, the other to the left. A reclining posture of the patient has in my experience not seemed sufficient to improve the drainage materially, and it is probably as a rule impractical to have the patient lying face downward.

On account of the difficulty with drainage, the cavity has been irrigated with saline solution and with various antiseptics, such as thymol, phenol, and lysol. Kocher⁴² warns against antiseptics and Kuttner uses sterile water. I have used Dakin's solution in two cases of severe hemolytic streptococcus infections. In both of these death occurred from generalized septicemia. It seems noteworthy, however, that one of these patients lived several weeks following drainage of a large bilateral empyema and purulent pericarditis, and with biliary fistula into the pericardial cavity. He died from a hemorrhage into the pleural cavity, probably from the corroding action of the solution on a subpleural abscess cavity, such as was often observed in similar cases during the hemolytic streptococcus epidemic.

An original method of drainage recently described by Whittemore consists in inserting a catheter by means of a trocar and cannula into the pericardial cavity, directing it backward from the left around the heart to the posterior

recess. The pus is aspirated, but no irrigation used. His patient, who had a purulent pneumococcic pericarditis, with double otitis media as a complication, made a good recovery. Possibly this method, combined with Dakin's solution irrigation, may prove to be safe and practical. My preference, however, would be to combine the irrigation with open drainage. Pneumothorax is not a factor in the drainage of pericarditis with effusion.

RESULTS

Venus, in a series of 178 collected cases treated by aspiration, intercostal incision, or rib resection, found the combined mortality to be 56.18 per cent. Ninety-three patients were treated by aspiration; many of these, however, had suppuration from the earlier period before open drainage had been instituted; all of these died. Of ninety-three patients treated by aspiration 62.37 per cent died, 31.18 per cent recovered, and 6.45 per cent were improved. Venus ascribed only one death to the operation. Many of the patients were moribund at the time of operation, and many of these made a temporary recovery. Intercostal incision for drainage was performed in forty-nine, with a mortality of 53 per cent. Rib resection for drainage was performed in thirty-six, with a mortality of 44.5 per cent. Rhodes, in 1915, reported eighty-six collected cases of purulent pericarditis with a mortality of 47.7 per cent. That little progress has been made in lowering mortality is indicated by the mortality of 40 per cent in a series of forty-nine cases collected since 1897 (Porter, Eliot, Rhodes). While mortality will always be high because of the serious nature of the disease conditions with which pericarditis with effusion is associated, any lowering of mortality will probably be through earlier diagnosis and treatment, thus forestalling myocardial degeneration, and through more adequate drainage of the postcordial recesses.

Since pericarditis is essentially a complication and not a primary disease, the prognosis and results of surgical treatment must necessarily depend to a great degree on the nature and severity of the primary process. Sears found that of fifty-one patients with pericarditis following rheumatism only 5 per cent died, while of forty patients in whom the condition was associated

with other etiologic conditions 80 per cent died. Any attempt to establish the relative merit of various forms of surgical treatment should therefore be through separate studies of results in the various etiologic groups. The available studies furnish the basis for only a very general estimate of mortality and results of treatment.

MAYO CLINIC SERIES

During the last two years nine cases of pericarditis with effusion have been treated surgically at the Mayo Clinic. Four were cases of serous effusion, four purulent, and one hemorrhagic. The primary or associated disease conditions in the cases of serous effusion were (1) bronchopneumonia following thyroidectomy for exophthalmic goiter; (2) pulmonary tuberculosis, myelogenous leukemia, bilateral pleurisy with effusion, and ascites; (3) bilateral pleurisy with effusion; and (4) bilateral pleurisy with effusion and ascites, Pick's syndrome.

In the first case aspiration of 120 c. c. of serous fluid produced a remarkable improvement in the whole clinical picture, and the patient progressed to a complete recovery. In the second case 220 c. c. of fluid was aspirated. The patient died the same day. Necropsy revealed bilateral pleural effusion and ascites and acute miliary tuberculosis involving the pericardium, lung, liver, and tracheobronchial lymph glands. Pericardiocentesis in the third case yielded 50 c. c. of serous fluid. The pleural cavities were aspirated on four occasions, and from 600 to 1600 c. c. of fluid evacuated. The patient was discharged improved. He died at home six months later. In the fourth case, aspiration of 100 c. c. of pericardial fluid was followed by marked improvement. Later the pleural cavities were aspirated, and from 900 to 1350 c. c. of serous fluid evacuated. *Bacillus tuberculosis* was demonstrated in the sputum. The patient was discharged essentially unimproved and died a few weeks later. Necropsy was not performed.

The suppurative pericarditis in each of the three cases was due to a hemolytic streptococcus, in two, of the epidemic type. On one of these cases the pericarditis developed during convalescence following bilateral dissection of the submaxillary triangles for epithelioma of the lip. At exploratory aspiration 350 c. c. of pus was aspirated through a hypodermic needle. The

next day about 200 c. c. of pus was evacuated by open drainage. Dakin's solution irrigation was used in this case, but only after the patient began to show signs of myocardial degeneration following several days of drainage. He died suddenly with symptoms of cardiac failure. Necropsy was not allowed.

The second case was one of epidemic streptococcus bronchopneumonia, with bilateral empyema, following thyroidectomy for adenoma. The empyema was drained by the closed method and Dakin's solution irrigation instituted. Pericardiotomy was performed following two aspirations. The patient died with symptoms of septicemia. The necropsy revealed a bilateral empyema with involvement of the myocardium and liver, and with cellulitis of the chest wall.

In the third case primary pericardiotomy was performed with evacuation of 500 c.c. of pus and secondary drainage of both pleural cavities for empyema of 500 and 1500 c. c. respectively. The pericardial cavity and both pleural cavities were irrigated with Dakin's solution. A biliary fistula developed which drained into the pericardial cavity. The patient lived several weeks, and seemed to have a fair prospect of recovery, when he developed a sudden left intrapleural hemorrhage from which he died. Necropsy was not permitted.

Pericardiotomy was performed also on two occasions in a case of chronic tuberculous pericarditis, which clinically seemed primary in the pericardium. At the first operation the pericardium was sutured following evacuation of 2 liters of purulent exudate. A specimen of excised pericardium showed tuberculosis. The fluid reaccumulated. At the second operation the pericardial cavity was left open, but the skin was closed in an attempt to secure subcutaneous drainage. Sufficient time has not elapsed to warrant a statement concerning the ultimate results following this procedure.

In the case of probable malignant hemorrhagic pericarditis aspiration was carried out on thirteen occasions, and a total of more than 2 liters of hemorrhagic fluid obtained. The site for aspiration was outside the nipple line, fifth interspace, in the costoxiphoid angle, and, after fluid could not be aspirated there, to the right of the sternum. The etiology at the onset in this

case seemed very obscure. The Wassermann test was strongly positive and the effusion followed an arsphenamin reaction but microscopic examination of an excised cervical gland showed adenocarcinoma.

The technic in all these cases has been simple. All operations with the exception of one have been performed at the bedside, under local anesthesia. For aspiration a 20 c. c. record syringe with a 4.5 cm. needle has been used. Pericardiotomy has been performed following resection of the fifth or sixth cartilage, or of both. The pleural cavity has not been opened in any case.

SUMMARY

1. Pericarditis with effusion occurs most frequently in association with acute rheumatism. Other primary disease conditions commonly associated with it are pleurisy, pneumonia, the acute general infections, tuberculosis, and chronic nephritis. In children pericarditis usually follows pulmonary or pleural infection.

2. The most characteristic symptoms are increased precordial dullness, feeble or absent heart sounds, absent apex impulse, small rapid pulse, dyspnea, and cyanosis. The onset may be insidious and the symptoms latent.

3. Exploratory pericardiocentesis may be necessary to establish the diagnosis of the presence of fluid and its nature.

4. Exploratory pericardiocentesis with a short hypodermic needle which infiltrates the tissues with novocain as it enters is as simple and painless and will probably prove equally as harmless as exploratory aspiration of the pleural cavity.

5. The point of election for aspiration seems to be in the region of the left mammary line, fifth interspace, just inside the left border of dullness. In case aspiration here is negative alternative points are beneath the xiphoid process (Marfan) at the left sternal border and at the right sternal border in the fifth interspace.

6. A negative aspiration at any one point, especially at the left sternal border, does not exclude the presence of fluid.

7. A serous effusion is usually sterile, but it may be infected. A purulent exudate is usually infected, but it may be tuberculous or secondary to malignant disease.

8. Preliminary partial evacuation of any exu-

date may probably be accomplished during exploration through an aspirating needle and a small syringe.

9. A sterile exudate, except the persistently recurring type, should be evacuated by aspiration through a small short needle.

10. An infected exudate should be evacuated by pericardiotomy after preliminary resection of the cartilage in order to secure wide open dependent drainage.

11. If the patient is critically ill a bedside operation under local anesthesia is especially indicated. Knife section of the cartilage obviates the necessity of freeing it from underneath before it is resected.

12. Owing to anatomic variations in the reflection of the left pleura, a transpleural operation may be unavoidable. In suppurative pericarditis the leaves of the pleura, however, probably are adherent, and thus wall off the pleural cavity.

13. The most dependent parts of the pericardial cavity on each side of the vena cava must be reached in order to secure the most efficient drainage and to prevent possible encapsulation of exudate behind the heart.

14. Irrigation by promoting evacuation of the exudate seems to be a rational measure supplementary to drainage.

15. The mortality rate, which is high on account of the severity of the primary disease conditions especially with which purulent pericarditis usually is associated, will probably remain relatively high; however, it may probably be reduced materially by the earliest possible diagnosis, prompt evacuation of any exudate causing mechanical embarrassment to the heart, and by wide open adequate drainage in the infected type of the disease.

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DISCUSSION

DR. F. A. WILLIUS, Rochester: A discussion of the operative treatment of pericarditis with effusion presupposes a correct diagnosis. I have enjoyed the paper by Dr. Hedblom very much, and it is not my intention to detail the signs and symptoms of pericardial effusion. However, I wish to emphasize a few points which are very important in the recognition of a condition which is very frequently obscure.

The signs and symptoms of pericardial effusion are two-fold: first, those from impediment to the circulation from the pressure itself, and second, the symptoms arising from the infectious process, if the effusion has an infectious basis. The first factor I wish to emphasize particularly.

The symptoms from a mechanical standpoint are two-fold: first, whether the effusion is developing rapidly, and second, whether or not the effusion developing is large in amount. You will recall that the normal pericardial contents are about 30 c.c., and the normal pericardium does not distend until 100 c.c. are present. These figures are approximate. In moderate or large pericardial effusions which are developing rapidly certain phenomena are present which are very important. A pulse rate which progressively accelerates, with diminishing amplitude of contraction, should attract attention to pericardial effusion. This has a physiologic basis. A heart beating against increased resistance on all sides must diminish its amplitude of contraction, and the compensating mechanism to prevent circulatory failure is pulse acceleration to maintain volume out flow. This can only be accomplished in one way. With this status the patient does not die of infection, but dies of mechanical impediment to the circulation, unless this is relieved. With a chronic pericardial effusion, which develops over weeks or months, the cardiovascular system has had time to adapt itself to the increased load which is largely accomplished by muscle hypertrophy which favors increased amplitude of contraction.

Recently I had the opportunity of examining a patient with primary tuberculosis of the pericardium of 14 months duration, and at operation two liters of fluid was obtained. That patient at no time was running a pulse rate exceeding 100, so that the ques-

tion of adaptation to the increased fluid is extremely important. I think that any case that presents a progressively accelerating pulse rate with diminished amplitude of contraction, dyspnea, cyanosis of the head and neck, must attract attention at once to the presence of a rapidly developing pericardial effusion.

DR. W. H. MAGIE, Duluth: This paper reminds me of a case of suppurative pericarditis that came under my observation many years ago. The case was particularly interesting because it was mistaken for a case of empyema; the dullness extended around to the axillary line. We had only seen the case a few hours before operation. We inserted a needle and found pus, and our diagnosis was circumscribed empyema. The man had been sick about a month, and after we had resected a couple of ribs and evacuated the abscess we came into the pericardial sac. The sac was very much thickened, and we could see the heart and handle it as well. This case simply showed that sometimes the collection in the pericardial sac is so great that it often passes beyond the nipple line extending around to the axillary line. This patient recovered, as far as the pericarditis was concerned, with drainage. After about eight weeks the man had gained twenty pounds in weight. He suddenly developed multiple phlebitis and died of it in a short time. How the pus entered the circulation, I do not know, as the drainage wound had been entirely closed for several weeks.

DR. A. C. BAKER, Fergus Falls: I think the technic Dr. Hedblom has given us is of a great deal of importance to the average practitioner, especially since we have seen a great many more of these cases of pericardial effusion in the last three or four years; and since the epidemic of influenza every man has seen a great many cases of multiple serositis, including pericarditis with effusion. When one reads up on these things he finds that the ordinary textbook tells us that there is a great deal of danger in aspirating the pericardial sac; at least, that is the impression I get from the literature as we have it today.

I think one thing Dr. Hedblom brought out, and which should be impressed upon most of us, is the fact that probably 100 will die because of lack of recognition of the pericardial effusion where one is being taken care of. There are one or two cases that have been reported in the literature of death from aspiration. In aspirating in the midline just to the left of the sternum many times one cannot get any fluid because the heart is raised toward the chest wall. You think you are mistaken in your diagnosis, while if you use the technic he has described employing a small needle, if you touch the heart, you do not do any damage, your diagnosis is made, and a great deal of help can be given to the patient. His technic is the important thing, and one that all of us should use.

DR. CARL A. HEDBLOM, Rochester (closing): I

only wish to emphasize two points, one of which is that there are probably scores of cases of pericarditis with effusion found at postmortem to every one that is recognized in vivo and properly treated.

The second point is, that if one attempts to aspirate in case of pericarditis with effusion for the relief of the intracardiac pressure which Dr. Willius mentioned, it is necessary to exercise patience, if one uses a small hypodermic needle. I had a case of hemorrhagic effusion which illustrates that point very well; I inserted the needle outside of the left nipple and got about 100 c.c. There was a stoppage of the flow; I moved the needle a millimeter or two and in a short time the flow was re-established. We continued aspiration and drew off about 1400 c.c., and the improvement in that patient, who had been almost moribund, was very striking. If, after a persistent attempt, one fails to get fluid at the nipple line, the needle should be inserted near the sternum or underneath it, in the xiphisternal angle. The important point is that it requires patience and a considerable amount of time to aspirate the fluid through a fine needle.

DERMATOLOGY AND INTERNAL MEDICINE*

S. E. SWEITZER, M. D.
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Highman, in his recent book, defines a dermatologist as an internist who knows the skin. This somewhat idealistic state is not always reached, I am sorry to say, but an endeavor will be made here to show the intimate connection between dermatology and internal medicine, and to emphasize the necessity for closer co-operation between the two specialties.

Hebra, the great Viennese dermatologist, was the pioneer in the study of skin diseases. He and his followers assumed that all dermatoses were peculiar to the skin and denied any general causes for them. The French, on the other hand, early began to reason that all dermatoses had an internal, or general, causation. Modern dermatology has taken a middle ground between these two extremes and we are endeavoring to co-ordinate cause and effect.

Certain diseases, such as nephritis, diabetes, the leukemias and anemias, either predispose to cutaneous eruptions or have as part of their symptomatology definite cutaneous lesions. This is particularly true of the leukemias and a blood examination is called for in many cases of chronic itching dermatoses. The skin manifestations in leukemia are very numerous, but the ones most commonly seen are the thickened eczematous-like, itchy patches.

The question of food sensitization, or idiosyncrasies to various articles of diet is a very important one, especially as regards the infant. Roughly classifying infantile eczemas we can say that the moist forms usually show a fat indigestion, the dry forms a disturbance of the carbohydrate metabolism. If neither of these are the cause, it may be due to the milk or to egg albumen, and if not these, may be a deficiency in thyroid secretion.

In certain of the generalized eczemas in adults, it may be of great help to reduce the diet to a minimum and often a fat-free diet will do more than any one thing in the prevention of relapses, which are so common in these conditions.

Errors in diet influence to a greater degree than commonly supposed, the course of the seborrheas and the acnes. This is especially true in acne rosacea, a disease of middle life which occurs more often in women than in men, and is very disfiguring; any procedure that will help in its cure and aid in preventing its recurrence, is well worth while. In this disease, the elimination of meat from the diet and the substitution of vegetables is of the greatest value.

In seborrheic dermatitis, we often find a disturbance of the fat metabolism; these patients frequently eat too much meat and fats, such as cream and butter; a fat-free diet is indicated here.

In acne vulgaris we must look out for the starches and sugars, although close study of these cases metabolically show no real change that we can assume to have an etiological bearing.

In diabetes, the skin may be normal, be slightly inflamed, itch more or less, become infected with pus organisms, or become gangrenous.

Cases of furunculosis should be examined for sugar in the urine, and a blood sugar examination will sometimes show an increase in this disease before sugar is found in the urine. In such cases, a proper regulation of the diet is again indicated.

The question of focal infections is continually coming up in a dermatological practice; abscessed teeth often seem to be the exciting cause of pustular lesions of the face. Rarely are they the cause of a generalized dermatitis. Recently a herpes zoster of considerable extent was seen. The pain was very severe but relieved at once on the removal of an abscessed tooth.

In erythema multiforme, we must look for some hidden focus of infection. Diseased tonsils, or abscessed teeth, may be removed with the hope of preventing recurrences.

In erythema nodosum, we have a condition

*Presented before the Minnesota State Medical Association, Duluth, August, 1921.

that may be due to a streptococcal infection or, as some of the later writers assume, it may be due to tuberculosis. These cases call for a very careful examination to determine the cause of the disease and its removal if possible.

Lupus erythematosus may possibly be associated with focal infection as in one case seen a year or so ago; the removal of a few teeth caused a generalized outbreak of acute lupus erythematosus with apparent involvement of the lungs and death ensued after a long period of high temperature.

The large group of occupational dermatoses are of especial interest at this time, on account of the new compensation law—mechanics, bakers, workers in flaxseed, painters, furniture makers, photographers—to name only a few of the many occupations that are especially prone to have dermatitis result from longer or shorter work in various chemical substances. Lately, it is quite common to see an occupational dermatitis on the hands of dentists due to either apothesine or novocaine. Some of these patients go on many months without the cause being discovered. A dentist seen recently would not believe that his trouble could be due to the use of novocaine. An attack of appendicitis, with a subsequent stay in the hospital, caused his hands to heal up completely. In such cases, a change to some other anesthetic can be tried.

The question of tuberculosis in its relation to the skin is a large one. In this climate, however, we do not see so much of this as in other localities. An exception must be made in the case of the so-called "tuberculids" as they are more frequent.

Recently, in a case of malignant endocarditis, a number of localized infarcts occurred in the skin of the fingers especially. This is a condition seen in certain other infections that are carried by the blood stream.

CONCLUSIONS

The enumeration of these few conditions show the necessity of many cases of closer study than we were in the habit of giving a few years ago. The use of blood examinations and blood chemistry, with often complete physical examination and metabolic study, will be found necessary in many of our cases. Co-operation with a good internist is of the utmost aid in many of our dermatological problems.

625 Syndicate Bldg.

DISCUSSION

DR. N. L. LINNEMANN, Duluth: As Dr. Sweitzer has tried to point out, dermatological diseases are not considered local disturbances and have not been so considered for some time back. Dermatology, like other specialties, has not been at standstill and we have learned that the skin manifestations may only

be symptoms of the real trouble. Hebra and others have thought they were local diseases, but we have realized that they are not. For instance, in a case seen here recently—a lady aged fifty years who had for fifteen years had a rash during the summer months had to go to bed during June, July and August. Examination showed hypertension and some albumin. She was placed on the regulation diet, diuretin was given as internal treatment, and this year for the first time in fifteen years she has been able to be around and has had no trouble with her skin. If we were not able to examine our patients carefully we certainly would not find these conditions. As Dr. Sweitzer stated, in the acne group—particularly acne rosacea, we want to be sure of the diet, especially in middle life. The acne vulgaris is not so important. He did not mention the skin lesions due to syphilis, which are so often treated for eczema, and unless a blood examination is made no cure will be effected. These cases are usually so spectacular that two or three doses of arsphenamine will clear up the rash. I do not mean to be understood that the disease will be cured, but the rash will clear up.

He mentioned the internist, but it seems to me quite as important to have the pediatrician and the nose and throat man see these cases as the internist, because in many instances they have an infection of the nose and throat and we would not expect to have the internist see these cases. In babies, we have been accustomed to see the cases with the pediatrician and there is no question but that the pediatrician has the bulk of the work in these cases. I have long ago ceased to treat these eczemas alone.

In other words, dermatological lesions are not local, but we have to study our patient as a whole, as other specialists do, and in that way we are much more likely to arrive at a definite diagnosis.

DR. ARTHUR H. SCHWARTZ, Duluth: I was very much pleased to hear Dr. Sweitzer's paper and am glad he brought out the importance of group study of dermatological conditions. I agree with Dr. Linne- mann that the examination should be quite general and not confined to the internist. As to the question of acne and diet, and that includes the seborrheas, I have for a long time believed that diet played no part in acne or seborrhea. I have taken the stand that it is due rather to an endocrine disturbance and have regulated the diet effect on hypo- or hyperglandular secretion and think I have gotten further along in these conditions. Other conditions that arise very frequently are the urticarias and allied dermatoses. We have found these are often due to the focal infections. What I wish to bring out is the question of infection in the sinuses. We have found many of the giant urticarias and dermographias to be due to sinus infection. I also recall a case seen recently of lupus erythematosus which was cured by an operation which incidentally developed for some gynecological disturbance.

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EDITORIAL

THE SOUTHERN MINNESOTA MEETING

The annual meeting of the Southern Minnesota Medical Association, which took place early in December at Mankato, met the expectations of the members and showed that same enthusiasm which has always typified the meetings of this society. The meeting was well attended and the papers were presented largely by representative physicians and surgeons of the southern part of the state. In marked contrast to the meeting a year ago there were very few addresses by visiting physicians. The subject which received the most consideration was that of cancer. It is startling, even to the physician, to learn that cancer kills more than twice as many human beings each year as were lost in our army during the world war. The very definite marked increase in deaths due to cancer in recent years is also cause for alarm, and it would be well for the medical profession in general to concentrate on the subject of cancer in an endeavor to meet this serious situation.

Mankato lived up to its reputation as an entertaining host and the social side of the convention was not lost sight of.

The next meeting of the association will be held at Rochester. The following officers were elected:

President—Dr. W. F. Braasch, Rochester.

Vice Presidents—Dr. W. H. Condit, of Minneapolis, and Dr. E. G. Luedke, of Fairmont.

Secretary-Treasurer—Dr. H. T. McGuigan, Red Wing.

Dr. A. F. Schmitt, who has done such splendid executive work for the association during the past eight years, was re-elected secretary-general.

ST. PAUL CLINIC WEEK

Elsewhere in this issue of the journal appears an outline of the various activities planned for Clinic Week in St. Paul, January 10th to 13th.

Certain medical meetings, those of the American Medical, State Medical and Southern Minnesota Medical Associations, are entirely didactic. Last year St. Paul Clinic Week was almost entirely clinical. A happy mixture of these two methods of medical instruction has been arranged for the meeting this winter.

Questions are often asked regarding the value of medical meetings. That medical meetings are becoming more numerous and that attendance does not decrease, indicates the demand for professional associations of this sort. The information contained in the essays presented is not all the attraction. If this were so we would all stay at home and read our journals. Seeing others work is not in itself so valuable. But there is an intangible something, perhaps nothing more than an inspiration, derived from contact with the recognized leaders of the profession. In attending a clinic there is the opportunity to see how others handle those little details, the observance of which means perfection. Then too we all have that human instinct for association with those interested in the same field of endeavor.

THE SHEPPARD-TOWNER BILL

The new Sheppard-Towner bill for maternity and infant welfare, as passed by Congress November 19, 1921, bears little resemblance, we are told, to the original bill. In short it provides ten thousand dollars the first year and five thousand each year for five years there-

after to each state for administration work, and a percentage, according to population, of a million dollars each year for six years providing a state submits in detail an acceptable plan for the dissemination of "instruction in the hygiene of maternity and infancy through public health nurses, consultation centers and other suitable methods." The bill is directed against the high infant and maternal mortality in the nation, and may rightly be termed preventive in nature.

The bill was framed with the avowed purpose of placing the method and administration in the hands of each state with the provision that the plan submitted is to be approved by a committee of three in Washington. The apportionment is contingent upon appropriations by each state, and, although a rather trifling amount, will serve to stimulate state action.

In Minnesota a bill was passed at the last session of the legislature which provided for the protection of maternity and infancy but carried no appropriation. This bill authorized the State Board of Health "to provide instruction and advice to expectant mothers during pregnancy and confinement and to mothers and their infants after childbirth." It is restricted to residents in the state and provides that no woman shall be affected in her civil or political rights nor have her identity disclosed except by written order of the board. The board is empowered to make reasonable rules and regulations, accept private gifts, cooperate with other agencies, make investigations, and report to the legislature its activities. The state of Minnesota accepts the provisions of any act of congress providing for cooperation between the government of the United States and the several states in solving problems for the protection of maternity and infancy. It empowers and directs the board to cooperate with the Federal Children's Bureau in carrying out the purposes of such an act. The state of Minnesota is, therefore, in a position to derive whatever benefit may accrue from the passage of the federal law providing ten thousand dollars is immediately provided for beginning this work. After June 30, 1922, only five thousand dollars will be available for the ensuing years until the legislature sees fit

to make further appropriation. Just what method of procedure the Children's Bureau will advocate has not been announced. If the bill will help to reduce maternal and infant mortality it will accomplish a desirable result. Time will tell.

It is interesting to note that our legislators in drawing up the final form of the bill took cognizance of the objections expressed in various medical journals.

We must admit that we see no opening wedge for social insurance in this bill as passed. On the other hand, we believe that the display of sound business sense at Washington, and as little government interference with ordinary business relations through control and taxation, will do more for the health of the average American than numerous bureaus and departments. Health is the accompaniment of individual prosperity.

GOVERNMENT OWNERSHIP OF THE PROFESSION

Every member of the profession in the state should make a point of reading the leader in this issue on Social Insurance by Dr. Dennis. We can assure the reader that he will find the article delightful and, what is more important, instructive on a live issue of the day. Although the associated labor unions and the organized medical profession have put themselves on record as opposed to this form of government activity, there is a very appreciable element in the country, for the most part radical and socialistic, that is pushing compulsory state health insurance.

We have expressed ourselves editorially on several occasions as unalterably opposed to either federal or state management of health (or sickness) insurance. That is, we are opposed to government ownership of the medical profession as we are opposed to government ownership of any other profession, public utilities in general or any activities which can be run by private individuals or corporations. And why? For one reason because it has been proven over and over again in our country and before our eyes that government management is extravagant and inefficient. We need only mention the Panama Canal and the recent fed-

eral control of the railways. The working out of government insurance in Great Britain and Germany surely proves that government ownership of the medical profession does not work to the advantage of either the public or the profession. Will it be necessary for us as a nation to follow in the footsteps of Germany and Great Britain before we are convinced?

As Dr. Dennis has ably pointed out, there will be a department of clerks and office holders, more or less under the influence of politics, with the accompanying red tape and paper work, and the vast number of medical calls for petty complaints will make painstaking medical analysis impossible and reduce practice to a clerical job.

There are certain medical activities which must of necessity be handled by the government. The control of contagion is perhaps the activity of first importance. The federal government has deemed it necessary to furnish treatment in its attempts to control venereal contagion. Many states have provided sanatoria in the combating of the tuberculosis scourge. The larger cities are offering free diagnosis and the services of a squad of nurses in their fight against the spread of tuberculosis. As a rule the activities of government in the medical field are in the realm of preventive medicine and should be so restricted.

ANTHRAX, AND THE CHEAP SHAVING BRUSH

A contemplation of the role that bacteriology has played in modern medicine calls attention to anthrax as one of those diseases that has been controlled in the past fifty years. Even as recently as the decade from 1890 to 1900 there were reported in Italy 24,052 cases of anthrax with 5,812 deaths. There are still sections of the world where anthrax is not an uncommon disease, although the percentage of deaths has been greatly reduced since the use of anti-anthrax serum.

A most interesting review of the entire subject of the treatment of anthrax and the mortality statistics has been published recently by Dr. J. C. Regan¹ of the Kinston Avenue Hospital, New York City. This review points out the disadvantages of various methods of local therapy

and calls attention to the actual danger that many of them possess. The plan of dosage and the interval between doses of anti-anthrax serum is described. The serum prepared by the Bureau of Animal Industry, or according to its method, has been proved of marked potency, being according to certain reports twice the strength of European preparations. In connection with this report the review of Schall² of fifty-one cases treated at the Massachusetts General Hospital from 1888 to 1918 is of interest. The mortality in these cases was 13.7 per cent. However, 44 per cent of the patients treated surgically died, while there was a mortality of only 7 per cent in those treated non-surgically.

Within the last five years the interest of the medical profession has been centered on anthrax because of the history of "malignant pustule" appearing in men who have recently used new shaving brushes, so that at present the danger that lurks in the cheap shaving brush is well recognized. Such brushes are often made with horsehair imported from China, Japan, or Siberia. Smyth³, in investigating the anthrax problem in horsehair, found virulent anthrax bacilli in Chinese hair imported under consular certificate, while none was found in domestic hair. He has reviewed the methods stipulated by the Bureau of Animal Industry for sterilization of horsehair, but recommends even more thorough sterilization before imported hair is considered safe for use. In fact, nothing short of absolute sterilization by steam under pressure for sixty minutes at 15 pounds when the hair is in bundles, and two hours at 15 pounds for baled hair, is considered safe by this writer.

The attention of the public has been recently called to the danger that lurks in the cheap shaving brush, in a recent issue of the *New York Times*⁴. The death of Michael F. Farley, former representative from the Fourteenth Congressional District, caused by anthrax contracted from a shaving brush, is the occasion for this

1. Regan, J. C.: The advantage of serum therapy as shown by a comparison of various methods of treatment of anthrax. *Am. Jour. Med. Sc.*, 1921, clxii, 406-423.
2. Scholl, A. J., Jr.: Anthrax: comparison of surgical and nonsurgical methods of treatment. *Jour. Am. Med. Assn.*, 1920, lxxiv, 1441-1444.

press comment. It is stated that of thirty-four cases of anthrax in New York City in the past nineteen months, twenty have been contracted from shaving brushes. There was a total of eleven deaths in the thirty-four cases, nine of the patients were shaving brush victims; the other two deaths were caused, one by infection from a tooth brush, and the other by infection from a scrubbing brush.

Major F. D. Francis⁵ of the Medical Corps, United States Army, cites a typical case of shaving brush infection in a soldier, similar to many that occurred during the mobilization of troops. In the conclusion of his article Major Francis states: "A list of firms furnishing standard acceptable brushes has been published by the Surgeon General."

It is the duty of the physician to inform and warn the public, whenever occasions arise, against the use of brushes that are not guaranteed by the manufacturer to be sterilized.

A. H. S.

3. Smyth, H. F.: The anthrax problem in horse-hair. *Jour. Indust. Hyg.*, 1920-1921, ii, 423-432.
4. New York Times, October 10, 1921.
5. Francis, F. D.: Report and remarks on a case of anthrax. *Mil. Surgeon*, 1921, xlix, 306-309.

OBITUARY

IN MEMORIAM*
DR. C. D. CONKEY

Mr. President,

Members of the Interurban Academy of Medicine:

Eight years ago I removed from my home in Illinois to Superior, Wisconsin, being, as was then supposed, a hopeless invalid. For a long time after that event I was indeed very sick. Then, merely by chance, I formed an acquaintance with your old comrade, Dr. Conkey. The doctor, being appealed to concerning my condition, diagnosed my case correctly, operated, cured my chief difficulty—suppuration of the maxillary antrums—and saved both my sight and my life. The acquaintance, thus begun, strengthened into friendship—a friendship which continued uninterrupted until rudely broken by the stern hand of death. Will you not, therefore, accept it as in some degree fitting that I, who am so deeply indebted to our old friend, should bring before you my ineffectual

endeavor at an appreciation of his character and life.

Charles Dewitt Conkey was born at Pontotoc, Miss., Dec. 1, 1856. His childhood was passed amid the fragrance of the magnolia and the wild rose, for he was a great lover of nature even in his tender years. Before the age of seven, indeed, he had formed the habit of seeking out the pleasant places where flowers were and the great southern trees. His love of nature remained with him till the day of his death. At the age of nine Charles removed with his parents to Appleton, Wis. Here he soon joined the Presbyterian church, of which he was ever an active member. When he had received his high school diploma, he decided to follow his father's occupation—that of school teaching. And he did indeed teach school, though only for a single year. Then he entered Lawrence College, at Appleton. Having completed at Lawrence the first two years in arts and sciences, he migrated to Rush Medical College, Chicago. From this institution he received his degree in 1882. For the next eight years the doctor practiced general medicine at Larimore, N. D. Then, in 1889, he studied the eye, ear, nose and throat at the New York Post Graduate Medical School, and in 1890 located in West Superior, now Superior, Wis. He was the first physician in the northwest part of the state to confine his practice to ophthalmology and otolaryngology. To Superior, Dr. Conkey restricted himself for fifteen years, for three years of which time he was a partner with Dr. Detling. In 1905, however, he opened a supplementary office in Duluth, and, for about ten years, divided his time equally between Duluth and Superior. Then he became a member of the Duluth Clinic, in which institution he remained as oculist and aurist in conjunction with Dr. Winter, for five years, devoting all his hours of practice to Duluth but keeping his place of residence in Superior.

At Larimore, N. D., on Nov. 4, 1886, Dr. Conkey had married Mary Ellen Taylor. By her he had two children—Charles Dewitt and Ruth Taylor Conkey. At the end of the period above mentioned, which the Doctor spent in the Tuohy-Hirschboeck Clinic, he was obliged, by reason of his wife's rapidly failing health, to select some less rigorous climate than that which prevails at the Head of the Lakes. He therefore only two short months ago, left with his wife and daughter for Los Angeles, California, meaning to make that place his home. There he bought a house, rented and equipped an office. Just before he left Superior he was given a banquet and a keepsake by the members of the Douglas County, Wisconsin, Medical Society—a fact which has now become a source of especial satisfaction to those who gave.

In 1910 Dr. Conkey had undergone, in Duluth, a gall-stone operation. The wound had not healed well, and, a few weeks after the operation, the Doctor, while bowling, produced a hernia through the

*At the Nov. 16, 1921, meeting of the Interurban (Duluth-Superior) Academy of Medicine, the following appreciation of Dr. C. D. Conkey was read by Dr. T. H. Shastid, of Duluth. Dr. Conkey (who at the time of his decease, was well known throughout the Northwest) was the first physician in north Wisconsin to limit his practice exclusively to the eye, ear, nose and throat.

operation scar. From that time on, he had worn a truss. After moving to Los Angeles, the Doctor and his wife, on Labor Day, had spent some ten or eleven hours in motoring, and that night, the Doctor, feeling great pain, arose, and discovered that the hernia had very much increased in size. Next morning, accordingly, he entered a hospital, and, the day thereafter, submitted to an operation. For a time all seemed to be well, but the following forenoon at eight o'clock, the Doctor's heart began to fail and in the evening he died. This was on September 8, 1921. It will be a pleasure to the members of this Academy to know that Dr. H. J. O'Brien and Dr. Detling, both formerly of Superior, and the latter at one time a partner with Dr. Conkey, were present at the operation, and indeed were with him practically all the time until the end. Dr. Conkey, though suffering considerable pain, spoke often of his old friends in Superior and Duluth. He was also frequently engaged in forming plans for the further enjoyment of natural scenery in and about Los Angeles. The funeral was held, with perhaps an accidental appropriateness, at The Little Church of the Flowers. The interment was at Forest Lawn Cemetery, near Los Angeles. So short a time has elapsed while all these recent things were happening, that we who knew Dr. Conkey well, seem still to almost hear his voice about us, still to behold him moving to and fro at his daily tasks. It appears indeed only about five minutes since I saw him waving at me a rake and hoe and calling out cheerfully, "Now for the garden!"

Dr. Conkey's personal appearance needs no detailed description to this Academy. He was five feet, nine inches high, a little inclined to stoutness, with close-cropped white hair and no beard. A man of fine physique, his capacity for toil knew almost no end.

The Doctor's facial expression was always one of calm thoughtfulness and gentleness. Nor did this expression in the least belie his true character. For the keynotes of that character were simply these—calm thoughtfulness and gentleness. Dr. Conkey never knew to be excited. Nothing ever carried him away, ever swept him off his feet, lured him into violence. Yet, cautious in occupying a position, once he occupied it he held to it tenaciously.

Perhaps this calm, placid, unhurried nature explains to some extent his excellence as a diagnostician. At all events, in the realm of diagnostics it was that Dr. Conkey excelled particularly. I have sometimes thought that he could almost smell a disease out. He used to carry in his memory, as now I recall, list after list of points on differential diagnosis. And over almost any diagnostic problem he would ponder with a patience that is seldom seen. I behold him once again, as he sat before me on the day he diagnosed my own particular case: cross legged, a roentgen picture uplifted in his left hand, pondering, pondering. At length said he, "Pus"—one brief, monosyl-

labic conclusion, but, for me, an open sesame to incredible health and happiness.

Dr. Conkey was a man of great faith: faith in his fellowmen, faith in his profession, faith in his personal friends, his lodge, his church, his God. He used to say that the best way to help any one was to believe in him. So he believed in every person steadfastly, till the evidence was overwhelmingly against that man. Even then he believed more or less. He did not seem able to give up wholly his confidence in any one. This great faith in humanity seems in some sort to have been connected with his gentleness and tendency to ponder.

In turn, out of his great faith in humanity grew his wish to serve. Service and love were, in fact, his watchwords. To every patient, rich and poor alike, he endeavored to be of the utmost use. Not infallible, yet, in that calm, placid, unassuming manner, his whole soul went to his professional activities.

Out of his gentleness also grew a very striking characteristic of this man—his charitableness toward his brethren in the healing art. Wholly independent as he was in the formation of his opinions, he could not be easily hurried into prejudice. Over and over when I have heard some fellow physician castigating another in that other's absence, Dr. Conkey has entered at least some plea in the absent one's defense. I have even heard him do this when the absent one was a bitter enemy of his own. His nature was too gentle, too full of placid discrimination for him to fail to see that, in almost every controversy, there must be a second side.

Dr. Conkey, as general practitioner and as specialist, practiced medicine for almost forty years. Forty years of service to his Creator and to his fellowman; forty years filled with thrilling experiences, light and shadows, ups and downs—the lot of the doctor, specialist or general practitioner, everywhere. And now the places that knew him will know him no more. His calm bearing, quiet and gentle dignity, splendid physique, intense application, independence of spirit, and charity toward all, have become but a shadow, a mere memory, a name.

This, gentlemen, is a very strange world. The Doctor who saved my life has lost his own. He it is that lies in the darkness of the grave, while I whom he rescued am still in the light and in life. Only a few short weeks ago, as now it seems, the Doctor was standing before this very body, reading a contribution, as now do I. Strangely enough, the name of that paper was "Diseases of the Maxillary Antrum." Strongly tempted was I, on that night, when he had finished reading, to arise and acknowledge before you my great indebtedness to this excellent man and skillful ophthalmologist and rhinologist. But I feared that I might embarrass him. Little did I dream how soon without the least confusion to the Doctor, I might stand before you, lifting my humble

voice in a strangely inadequate eulogy of his character and life.

Life, gentlemen, life and death are both, strange, incredible. We cannot at all understand them. We only know that, for a season, one and another comrade is walking beside us: we see him, we listen to his voice; then, either with solemn warring or without, he leaves the road we were happily treading together, waves good bye, and is gone along some path of no return. 'At least so far as this life is in question there can be no return. Let us hope that, under the infinite mercy of a loving God, and in the great hereafter (which cannot be one whit more wonderful or miraculous than this life) all paths shall come together again, all friendships be renewed.

Patrick Henry Manion, M. D., Eyota, Minn., graduated from Rush Medical College, 1890, died recently, aged 57.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

CLINIC WEEK, ST. PAUL

The second annual session of the St. Paul Clinic Week will occupy Tuesday to Friday, January 10th to 13th inclusive.

The following will act as the Executive Committee for the Ramsey County Medical Society:

E. M. Hammes, M. D., Chairman.

E. M. Jones, M. D., Secretary.

F. E. Burch, M. D.

C. C. Chatterton, M. D.

E. V. Goltz, M. D.

L. A. Hilger, M. D.

O. W. Holcomb, M. D.

H. M. Klein, M. D.

J. C. Staley, M. D.

H. B. Zimmerman, M. D.

Clinics at the various hospitals will occupy each morning from 8 a. m. to 1 p. m., and a symposium consisting of essays by the local members of the profession will take place each afternoon from 2 to 4 o'clock. Visiting physicians will address the meetings the latter part of the afternoon.

On Monday afternoon and evening, January 9th, the Northwest section of the American College of Surgeons will conduct a meeting which will be addressed by Drs. Franklin Martin, George W. Crie, Harry C. Deaver, Allen B. Kanavel and John M. T. Finney.

Tuesday's symposium will be on "The Disturbances of the Thyroid Gland," to be followed by an address by Dr. Isaac Abt, of Chicago, on "Dilatation of the Colon in Children." Tuesday evening the Northwest Medical Officers' Association of the World War will have its annual meeting.

Wednesday's symposium on "Obstetrical Problems"

will be followed by an address on a subject of interest to the internists, by Dr. Charles L. Mix, of Chicago. An entertainment for the visiting physicians and their wives will be provided in the evening.

Thursday the symposium will be on the subject of "Right-Sided Abdominal Pain." The addresses following will be on an eye and ear and a nose and throat subject, the titles and speakers to be announced later. Thursday evening the annual banquet of the Minnesota Academy of Ophthalmology and Otolaryngology, to which all visiting physicians are invited, will take place.

Friday afternoon a symposium on "Tuberculosis" will be followed by Dr. J. C. Bloodgood in an address on "Bone Tumors."

The Ramsey County Medical Society, at its regular meeting November 28, 1921, elected the following officers for 1922:

President, Dr. John C. Staley; vice president, Dr. E. G. Sterner; secretary, Dr. E. M. Hammes; member of Finance Committee, Dr. John M. Armstrong.

Dr. H. E. Binger presented a paper with slides on "Indications for Mastoidectomy."

The Clay-Becker County Medical Society held their annual meeting at Moorhead on November 18, 1921. The meeting was addressed by Dr. Arthur T. Mann, of Minneapolis, and a resolution deprecating the situation resulting from the recent ruling of A. W. Mellon, Secretary of the Treasury, whereby physicians are entitled to prescribe wine and beer, was passed. The following officers were elected for 1922: President, Dr. C. H. Patterson, of Barnesville; vice president, Dr. G. L. Gosslee, of Moorhead; secretary and treasurer, Dr. H. J. Thornby, of Moorhead.

SOUTHWESTERN MINNESOTA MEDICAL SOCIETY

The thirty-eighth semi-annual meeting of the Southwestern Minnesota Medical Society was held at the Hotel Thompson, Worthington, Minn., Thursday, Nov. 10, 1921.

The following physicians were visitors at this meeting: D. W. Craig, G. G. Cotton, Thos. J. Billion, R. G. Stevens, M. A. Stern, Dr. Gregg, S. A. Keller, Fr. Putnam, E. D. Putnam and Dr. Parsons all of Sioux Falls, S. D. Drs. H. J. Brackney, G. E. Vermeer, and W. R. Brock of Sheldon, Iowa. Drs. R. Gurlmette and L. B. Williams of Worthington, Minn. Drs. Roy Andrews, J. W. Andrews and Carl J. Holman, Mankato. Dr. F. C. Scholdt, St. Paul and D. S. Basinger, Mountain Lake, Minn.

Dr. B. O. Mork of Worthington presented a resolution against the recent ruling of Secretary Mellon in regard to the liquor status which was carried by a unanimous vote.

The following officers were elected: President, Dr. B. O. Mork; vice president, Dr. F. M. Metcalf; secretary and treasurer, Dr. W. A. Piper; censor for Rock

county, Dr. C. O. Wright; censor for Pipestone county, Dr. W. J. Taylor; censor for Nobles county, Dr. F. M. Manson. Drs. F. G. Watson and A. G. Chadbourn were elected delegates to the State Meeting. Alternates Drs. C. L. Sherman and H. Doms.

The program as rendered:

"Mistakes"—Dr. A. G. Chadbourn, Heron Lake, Minn. Discussion by Drs. Lowe, J. W. Andrews, Carl Holman and Roy Andrews.

"Etiology and Diagnosis of Rachitis"—Dr. Walter Halloran, Jackson, Minn. Discussion by Drs. Knudson, Sogge, J. W. Andrews, Roy Andrews and Hoegh.

"Diagnosis and Treatment of Traumatic Injuries of the Spleen and Pancreas"—Dr. R. G. Stevens, Sioux Falls, S. D. Discussion by Drs. Holman, Stanley, Brock and Hoegh.

"Marginal and Jejunal Ulcers following Gastro-Enterostomy"—Dr. F. C. Schuldt, St. Paul. Discussion by Drs. J. W. Andrews and Basinger.

"Acute Pancreatitis"—Dr. F. M. Manson, Worthington, Minn. Discussion by Drs. Waller, Schuldt and Metcalf.

"Prostatic Hypertrophy"—Dr. B. O. Mork, Worthington. Discussion by Drs. Schuldt, Andrews and Holman.

The Minnesota Pathological Society of the University of Minnesota Medical School, Institute of Anatomy, held a meeting on Tuesday evening, November 15, 1921, at which papers were presented by Dr. Wm. Carpenter MacCarty and Dr. Donald W. deCarle.

This meeting was exceptionally well attended and an inspiration to all. The next meeting will be held at Heron Lake, Minn.

William A. Piper, Sec. and Treas.

OF GENERAL INTEREST

Dr. W. Chamberlain, of Waseca, has been spending several weeks in the East where he visited many of the large hospitals.

The marriage of Dr. William H. Von der Weyer and Miss Mildred M. Esswein, both of St. Paul, took place during October, 1921.

Dr. Lauritz Ylvisaker, of Minneapolis, has been appointed on the staff of the St. Paul Hospital, and has moved his offices to St. Paul.

The engagement of Dr. M. F. Eusterman, of the Mayo Clinic, Rochester, to Miss Brazzell, of Luverne, has been recently announced.

Dr. J. O'Neil, of Nashwauk, has given up his practice at that point and has moved to Manistique, Michigan, where he will make his future home.

Dr. J. B. Stevens, who has been associated with Dr. Chas. L. Sherman for the past year at Luverne, has moved to Sioux Falls where he expects to engage in the practice of medicine.

Dr. C. B. Lenont, of Virginia, recently visited

Philadelphia where he attended a session of the American College of Surgeons. Dr. C. W. More, of Eveleth, also attended the meeting.

Dr. C. J. Rowan, Professor of Surgery at the University of Iowa, gave a Mayo Foundation lecture, "Cause of Failure of Operations for Chronic Appendicitis," Tuesday, December 6, in the Assembly Room.

Dr. M. George Milan, medical director of the Oakland Park Sanatorium, of Thief River Falls, attended a meeting of physicians, superintendents and officials connected with health bodies of the state, recently held in Minneapolis.

Countess Irene di Robilent, Associate manager of the Italy-America Society, delivered a lecture before the meeting of the general staff of the Mayo Clinic, November 23; her topic was "Italy's Social Evolution and the Italians of Today."

Dr. W. J. Dowswell, formerly of Bellingham, has become associated with Dr. Oscar Daignault, of Benson. Dr. Dowswell has spent the past eight months in Chicago where he has been taking a post-graduate course in eye, ear, nose and throat work.

Dr. Nesmith Nelson has located in Brainerd, having taken the offices formerly occupied by the late Dr. C. S. Reimestad. Dr. Nelson is a graduate of the George Washington University of Washington, D. C., and of the Manhattan Eye, Ear, Nose and Throat Hospital of New York City.

Colonel McCarrison, of the medical service of Great Britain in India, spoke at the meeting of the general staff of the Mayo Clinic Wednesday, November 30, on researches on goiter from 1902 to 1921. He gave a Mayo Foundation lecture Friday, December 2; his topic was "The Effects of Faulty Food on the Gastro-Intestinal Tract."

The administrative board of the Medical School of the University of Minnesota, at its meeting on November 2, 1921, took the following action: That after consideration of the report of the Committee on Survey of the Medical School, the Administrative Board unanimously voted its approval of the administration of Dean E. P. Lyon.

The first examination of the National Board of Medical Examiners will be held in Philadelphia February 15th to 21st inclusive. Applications for examination should be received not later than January 15, 1922. Application blanks and Circulars of Information may be obtained by writing to the Secretary, Dr. J. S. Rodman, 1310 Medical Arts Building, Philadelphia.

Dr. C. H. Mayo was recently appointed Brigadier General in the Medical Reserve Corps of the United States Army, under an order issued by the War Department. General Mayo served in the office of the Surgeon-General during the War and rendered invaluable assistance in the re-organization of the medical department on the scale demanded by war-

time activities. He was awarded the distinguished service medal.

Dr. H. C. Jacobeous, of Stockholm, Sweden; Dr. G. Gasteneta, of Lima, Peru; Dr. S. Meri, of Dairen, South Manchuria; and Dr. F. A. Nyulary, of Melbourne, Australia, visited the Mayo Foundation and Mayo Clinic November 14, 15, and 16. Dr. Jacobeous, Professor of Internal Medicine at the Medico-Chirurgical Institute of Stockholm, gave a Mayo Foundation lecture on the use of the thoracoscope, Monday, November 14.

Dr. C. H. Gardner, commanding officer of the Aberdeen Public Health Service Hospital, was tendered a reception on Tuesday evening, November 8th, by the various organizations interested directly and indirectly in the work being done by the government for the former soldiers in St. Paul. Representatives attended, among others, from the Knights of Columbus, American Legion, Junior League, Girls Community Club and Shubert Club.

The attention of the medical profession was called, in the September issue of the journal, to the institution of a course by one of the laboratories in St. Paul devoted to the training of office assistants in laboratory work. Any physician desiring to obtain an office assistant who has completed this course and has prepared herself in the keeping of accounts and the performance of routine laboratory work should communicate with the office of the journal.

The National Health Exposition, occupying 60,000 square feet of floor space, will be held in the Jefferson County Armory at Louisville, February 1-9, 1922. This is under the auspices of the United States Public Health Service, State Board of Health of Kentucky, Jefferson County Board of Health and the Health Department of the City of Louisville. It will include exhibits in hospitalization, nursing, dentistry, medicine and pharmacy. The University of Louisville, the public school system, and various local, state and national health organizations will participate.

The annual conference of the city and county health officers, the annual convention of the Kentucky State Public Health Association and other health meetings are already scheduled in connection with the Exposition.

An institute will be conducted by the United States Public Health Service and its program will include:

Dr. M. J. Rosenau, Dean of the Harvard School of Public Health; Dr. Josephine Baker, Director of the Department of Child Hygiene, New York Board of Health; Dr. Wm. A. Evans, former Health Officer of Chicago and the most distinguished public health editor in America; George T. Palmer, President of the Illinois Tuberculosis Association and Director of

the Bureau of Tuberculosis of the Illinois State Board of Health; Dr. Frederick E. Greene, Secretary of the Council on Health and Public Instruction, American Medical Association; Dr. Valeria H. Parker, Director of the Interdepartmental Board of Social Hygiene; Dr. John H. Stokes, distinguished syphilographer of the Mayo Clinic; Dr. Frankwood Williams, Director of the National Association of Mental Hygiene; Dr. W. S. Rankin, State Health Officer of North Carolina, a member of the Council of Health and Public Instruction of the American Medical Association and recently President of the American Public Health Association; Dr. John Dill Robertson, Health Officer of Chicago; Dr. John R. McDowell, Director of Health for the Lake Division, American Red Cross; Dr. John R. McMullen, United States Public Health Service, and Miss Frances Brink, Director of the National Organization for Public Health Nursing.

Expenses will be paid through the sale of Commercial exhibit space to a limited number of reputable firms.

A similar Health Exposition is scheduled for Minneapolis March 20th to 25th, 1922.

A delegation of Serbian physicians, guests of the Rockefeller Foundation, visited the Mayo Foundation October 27 and 28. The delegation is composed of Dr. G. J. Nikolitch, Undersecretary and first medical officer of the Ministry of Health of Serbia; Dr. G. Joannotitch, Professor of Pathologic Anatomy, and Dr. R. Stankovic, Professor of Internal Medicine, in the Belgrade Medical School. Dr. Frank B. Stubbs, of the Rockefeller Foundation, and Dr. Henry John, of Cleveland, accompanied the delegation.

Sir Robert Wood, President of the Royal College of Surgeons of Ireland, Sir William Taylor, ex-president of the same organization and Professor Shoemaker, of The Hague, visited the Mayo Clinic November 1, 2, and 3. A meeting was held in their honor in the lobby Wednesday, November 2 at which time Sir Robert Wood gave a brief talk on education in Ireland; Sir William Taylor discussed the organization of the Royal College of Surgeons of Ireland, and Professor Shoemaker spoke on several ingenious operations on the stomach and colon which he had originated.

Dr. W. J. Mayo delivered the John B. Murphy Memorial Address before the meeting of the Clinical Congress of the American College of Surgeons in Philadelphia at which meeting honorary fellowship in the Royal College of Surgeons of Ireland were conferred upon him and Dr. C. H. Mayo.

The following is quoted from a letter from Dr. C. H. Lavinder, Acting Surgeon General of the United

States Public Health Service, to Dr. A. J. Chesley, Secretary of the Minnesota State Board of Health:

"On November 1, the United States Public Health Service opened a venereal disease clinic at Hot Springs, Arkansas. This clinic is made possible through the cooperation of the National Park Service of the Interior Department under whose jurisdiction the Hot Springs National Park is operated.

"The clinic is operated in a government building which has just been completed at a cost of \$300,000. One floor of the building is devoted to free baths for indigents. The other floor is devoted to the venereal disease clinic.

"The venereal disease clinic is not being established to attract venereals from other communities. For many years venereals have been coming to Hot Springs and one purpose of establishing the venereal disease clinic is to take care of the many indigents—some of whom are an interstate menace—who come in large numbers for treatment.

"It is the intention of the Public Health Service to extend to physicians, nurses, laboratory and social workers an opportunity for intensive work and instruction. The clinic is divided into syphilis and genitourinary sections. In addition all specialties will be represented on the consulting staff. The active staff has been selected from among the best men in Hot Springs. In addition to the resident staff physicians, the Public Health Service hopes to have some of the best specialists in the country deliver lectures at the clinic.

"Physicians and others desiring to receive instructions must make application to the Surgeon General, United States Public Health Service, Washington, D. C. No fees are charged for this instruction. All persons must provide their own maintenance. Physicians will be required to remain a minimum period of one month.

"The Public Health Service makes no pretense that in this short space of time it will be possible to make specialists of those who attend. It is hoped, however, to teach the primary principles of the diagnosis and treatment of syphilis, gonorrhea, etc. Opportunity will also be afforded to specialists for participating in intra-spinal and other advanced work.

"Graduate nurses will be admitted for instruction in venereal disease nursing. The nursing staff will be under a supervision of a hospital superintendent of nurses. The laboratory will be conducted by an officer of the Public Health Service, and research work by the staff and student physicians will be undertaken and encouraged. Social workers will be admitted for instruction in work relating to venereal disease cases.

"Application blanks, rules and regulations for operation of the clinic and any further information can be secured by writing the Surgeon General of the United States Public Health Service, Washington, D. C."

PROCEEDINGS OF THE MINNESOTA ACADEMY OF MEDICINE

November 9, 1921

Dr. H. L. Staples presiding.

Dr. George Douglas Head reported the following cases:

Case I. Chronic Adherent Pericarditis.

Chronic adherent pericarditis manifests itself in clinical forms often difficult to interpret. This is the silent type of the disease in which the condition is only discovered at autopsy and the patient gives no evidence during life of its existence. There is the second, the cardiac type, in which the patient presents the usual picture of advanced cardiac disease with partial decompensation. These cases are frequently interpreted as chronic endocardial or myocardial lesions, and with this diagnosis go to the autopsy table. There is the third form of the disease which might be well called the cirrhosis of the liver type, which is not so well recognized and understood and which is frequently misinterpreted. In this condition, recurring ascites, enlargement of the liver, and ill-defined cardiac signs dominate the picture. These cases are often puzzling because they present the signs of cardiac decomposition, without the high grade edema of the lower extremities usually manifested in this condition. The case which I have here to report is a typical example of the cirrhosis of the liver type of chronic adherent pericarditis.

Mrs. H. B., 27 years, married, no children. Gives a history of normal health up until about eight years ago, when she had an attack of acute inflammatory rheumatism, from which she recovered without complications. The tonsils were removed three years ago. She had a right sided pleurisy with effusion in 1919. The same year she also had an attack of influenza, after which time she did not recover her usual health. One year ago this fall, she first noticed a swelling in the abdomen. It came on without pain. If she would lie down and keep quiet the swelling would go away in two or three weeks. If she would stay upon her feet it would return. The swelling in the abdomen was not associated with any marked swelling in the legs. She did, however, have some puffiness of the face, also some cough. She also noticed that her breath was getting short, especially if she walked fast or climbed stairs. Her appetite was fair. She slept well. She went into a hospital at St. Cloud and was kept in bed for four or five weeks, when the abdominal swelling disappeared. She then got up and about but so soon as she got on her feet again the abdomen began to fill and again she went to the hospital where she was put to bed and the swelling in the abdomen disappeared. She was told that her abdomen was full of fluid. She had no nose-bleeds. Bowels were regular. No fever. The en-

largement of the abdomen with the presence of fluid has now returned the fourth time.

Examination: Patient was a woman of slender build. Marked cyanosis of the lips and cheeks, with a choked appearance to the face. Physical examination was negative for organic disease outside of the enormously enlarged heart, with signs of an adherent pleuritis in the right lower pleura and the large amount of fluid in the abdomen, with some enlargement of the liver. There was slight edema of the lower extremities. The heart was of tremendous size, the left border being at the anterior axillary line, the right border about 6 cm. to the right of the midsternal line. The heart was fixed in its position. In spite of the tremendous size of the heart no murmurs could be heard at any of the orifices. A distinct systolic tug, Broadbent's sign, could be made out in the fifth and sixth interspaces on the left at the outer margin of the cardiac area of dullness. The sounds were of good quality. The heart was very steady, about 95 to the minute. The abdomen contained a large amount of fluid. In a sitting position it reached to the transverse umbilical line. The liver was palpable about two fingers' breadth below the costal margin in the mammary line. The Wassermann was negative. The urine findings were negative except for a trace of albumin. The blood showed a mild secondary anemia. The clinical diagnosis of chronic adherent pericarditis was made, which the x-ray findings confirmed. You will notice in the films I have here calcareous plates imbedded in the pericardial wall, outlining very distinctly the pericardium in close proximity to the heart wall. In that position of the pericardium resting against the diaphragm, the calcareous deposits present a continuous solid wall, showing a gluing together of the pericardial surfaces and the heart wall. The condition is incurable but the patient may be able to survive a number of years under proper methods of living.

Case II. Chronic Mitral Disease of the Heart, with Pneumonia and Fibrinous Casts of the Bronchial Tree in the Sputum.

Mrs. C., 45 years, married, no children. Ill for many years with chronic endocarditis of the mitral valve, mitral stenosis and insufficiency. Had maintained a fair degree of compensation until April 17, 1921, when she began to have severe attacks of dyspnea, associated with cyanosis and numerous rales of the sibilant and moist bubbling type throughout both lungs, anteriorly and posteriorly. The heart was rapid and the heart sounds rather feeble in quality, with a loud double murmur at the apex area transmitted toward the axilla, and an accentuated pulmonary second sound. The attacks of dyspnea were severe. During the attacks the heart became rapid, 120 to the minute. Patient was required to sit up in bed to get her breath. The sputum was frothy, tinged with blood, and mucopurulent. About half a cupful of this material came up during a paroxysm.

The diagnosis of acute edema of the lungs was made, associated with chronic endocarditis of the mitral valve. From this time until October 10, 1921, patient was seen at various times. On September 8th she developed a sudden severe attack of pain in the region of the spleen, which was interpreted as an embolus with infarct in the spleen. On September 24th she complained of an attack of pain in the lower right chest, associated with increased cough, which was interpreted as an infarct in the lower lobe of the right lung. On October 10th patient was again seen with fever, cough, signs of consolidation in the base of the right lung behind and a leucocytosis of 18,200. At this time a diagnosis of pneumonia of the lower right lobe was made. On October 12th, after a severe coughing spell, accompanied by a good deal of dyspnea and cyanosis, patient coughed up a solid plug of fibrin showing the branching arrangement of the bronchial tree. (Water-color drawing exhibited.) Patient was then relieved for a number of days, when, on October 19th, a much smaller fibrinous cast was coughed out, and again, on November 7th, a much larger solid plug was gotten out after a severe fit of coughing. Patient was much relieved after each of these plugs was coughed out. The examination of the plug and of the sputum coughed up following the plug showed large numbers of pneumococci, with a streptococcus viridans in the culture from the sputum. (Specimen exhibited.) Since the coughing up of the last plug patient's condition has improved steadily. In the struggle to get out the fibrinous casts, patient's heart became very much tired out and she presented all the signs of a high grade decompensation, with considerable edema of the lower extremities. The administration of hydriodic acid or potassium iodid seemed to be of considerable help in loosening up the bronchial casts.

Case III. X-ray photographs were shown of the long bones of a case of osteomalacia in a patient, Mrs. John T., 57 years of age. The x-ray photographs were shown through the courtesy of Dr. Ernest L. Baker, with whom the patient was seen in consultation. The features in differential diagnosis were discussed. The Wassermann was negative in this case. No Bence-Jones body in the urine. The blood smears showed no evidence of malignant disease of the bone or of the bone marrow. No spontaneous fracture had occurred at any joint. No metastatic growths had developed at any point in the body, all of which features were considered sufficiently good grounds for the exclusion of myeloma or malignant disease. No Turck's irritation forms, myeloma, or other abnormal cells were found in the blood. The x-ray pictures, while showing diffuse, generalized rarification areas throughout all the bones rayed, did not present the usual picture of a malignant disease of the bone or bone-marrow. The case will be reported in full at a later time by Dr. Ernest L. Baker.

Discussion by *Dr. A. Schwyzer.*

The second report given by Dr. Head is a very rare condition of which I happen to have seen two cases. They were here in my own practice.

The first case I saw I put one of the casts between two glass plates and it was considerably larger than this one Dr. Head has shown. It was so large that after floating it in water you could put a good sized lead pencil into the largest bronchial tube. The patient had casts every two or three months. The woman felt severely ill and became cyanosed but had no fever. All at once she would have a severe coughing attack and was relieved after removal of the cast. I do not remember the later history.

The second case was not quite as severe and that was more of an acute condition. Judging from the size of the largest tube, the cast must have been from the bronchus of the lower lobe at least.

Dr. W. H. Condit reported the following cases:

Case I. Rupture of pregnant uterus. Mrs. O. D. Clinic No. 3160.

Past History: Negative for any severe illness. Patient aged 27. Gravida two. Three years ago had first pregnancy, went to full term and was said to be in labor for one week with moderate pains, when she was operated by Cesarean section and delivered of a full term child, said to weigh 10½ pounds, now living. The puerperium was complicated by peritonitis and drainage, phlebitis of the left leg, and was confined to bed five weeks.

Present History: On June 21, 1921, consulted me for care in her expected confinement—then in her fifth month. She made monthly visits at the office and had an uncomplicated anti-partum period. Expected date of maturity November 29th, 1921. On September 26, 1921, patient had mild pains in the abdomen early in the morning. Had a luncheon at 11 o'clock, consisting of canned beans. At 2 o'clock was seized with an extreme pain in the abdomen and vomited her luncheon. Was admitted to the hospital at 3 p. m., suffering severe abdominal pain in the upper abdomen in the region of the gall-bladder and some pain in the appendiceal region.

Examination: Abdomen quite distended and extremely tender all over. Hemoglobin was 65 per cent; leucocytosis 19,400; urine normal. No rhythmic contractions to suggest labor pains, having general disseminated pain over whole abdomen. Consultations at 6 p. m., 8 p. m., and 11 p. m. resulted in the decision that the patient was not in labor—was administered sedatives morphin and chloral at 11 p. m., 1 a. m. and 5:20 a. m. At 10 a. m. patient was much more distended, leucocyte count 22,000, pulse 140, temperature 100.4. A diagnosis of intrauterine or intraabdominal hemorrhage or both was made and immediate operation advised.

Operation: Incision was made parallel to the old abdominal scar. Uterus was hard, contracted with a wall 3 cm. thick. Suggested immediately a myomatous uterus with an abdominal pregnancy, as a

water tumor was palpable extending from the fundus up against the diaphragm. This was ruptured and did not contain the fetus. A rupture of the uterus was found through which the membranes with the entire amniotic fluid had been delivered and the buttocks of the child presented. This rent was enlarged and the fetus and placenta immediately delivered. The uterus was sewed with three layers of chronic gut and the abdomen closed as quickly as possible, the patient being in quite extreme shock. Stomach lavage before returning to the room, twice daily for 2 days. Forty-eight hours following delivery the patient was in good condition.

Case II. Recurrent Abdominal Pregnancy. Mrs. R. T. H., age 27, admitted to hospital April 8, 1920, with a diagnosis of acute appendicitis, complicating a six months' pregnancy. Last day of menstruation October 28, 1919. First noticed pain December 1919, and was in bed until February 19, 1920. Pain was very severe—patient lost rapidly in weight and strength. She was married six years ago, lived with first husband two years, was then single two years, and has had two miscarriages since the second marriage—both of two months' gestation. Her menstruations had always been regular twenty-eight day type, beginning at age of 13 and always normal. Blood pressure on examination was 130 systolic, 70 diastolic. All other functions and organs normal. Hemoglobin 58 per cent; leucocytes 13,280; P. M. N. 84; R. B. C. normal; Wassermann negative.

X-ray plate shows a fetal skeleton in mid-abdomen of at least six months' gestation; fetal heart sounds present. To the right of the large tumor, which undoubtedly is the membrane with the fetus, is a hard mass, which is undoubtedly the uterus.

Abdominal pregnancy was suspected, but no definite diagnosis made. After one week confinement in bed, patient was dismissed with instructions to report if pain became worse or if she had any bleeding. No fetal heart sounds heard; diagnosis of death of fetus made.

On May 25, 1920, patient called at office with a bloody discharge from the vagina and extreme abdominal pain. Operation the following day.

The uterus was found to be crowded under the right side of the symphysis pubis. Fetus was in the amniotic sac, macerated and deformed. Fetus was removed and peritoneum of patient was stitched to the border of placenta, which filled whole lower pelvis. Any attempt to remove placental tissue was accompanied by profuse bleeding. The wound was lightly packed and left for Nature to dissect off the placental tissue. Patient was confined in bed seven weeks and left hospital at end of eighth week in good health and continued in good health at her regular duties of a clerk until May 1921.

At that time she began having abdominal distress, accompanied by nausea, vomiting, inability to retain any food other than milk. She had one menstrua-

tion in June, flowed for two weeks in July. On July 28th, her hemoglobin was 78 per cent; leucocytes 11,200; P. M. N. 83; R. B. C. 4,000,000. She had a large abdominal tumor the size of her head. This tumor was soft and very tender under palpation. The diagnosis of an acute abdomen with the possibility of another abdominal pregnancy was made. Operated the 30th of July, and a live, 3½ months fetus was found intact in the membranes. Hemorrhage was most severe following delivery of the fetus. A five-yard roll of gauze was packed in the wound and left for four days, when we began removing it fractionally. The placental attachment was on the parietal peritoneum on the left side. The patient had an eventful convalescence and is at the present writing in good health.

D. H. L. Staples reported a case of hysterical hyperpyrexia.

A young healthy married woman had engaged in an exhaustive horseback race, also received very disturbing news concerning her husband. Menstruation just established. That night had a severe chill with a sharp rise of temperature, nausea and pain in the left ovarian region. Next day a more pronounced chill with higher temperature. Menstruation ceased. Third day chill and temperature of greater severity. Fourth day same condition continued. Heart, lungs, urine and blood normal. No abdominal rigidity. Quinin had no effect on chill or temperature. Uterus and appendages apparently healthy. Fifth day severe chill lasting over an hour followed by temperature of 107. A disturbing letter that morning received. The forenoon temperatures were nearly normal. No regular time for evening chill. She was removed to the home of her mother and more favorable news was received. Aside from a slight weakness at first, she has been perfectly well since the fifth day. This is a purely psychic condition induced by emotional disturbance. Some authors deny the existence of such a state.

Dr. A. Schwyzer reported the following cases:

Case I. A case of very large and movable cystic gall-bladder. The patient, a lady of about 35 years, had been advised to use a belt for her "floating kidney". This mass flopped back into the right kidney lodge, and could be pushed entirely beyond the midline over to the left. It was possible to make out its attachment to the liver. The diagnosis of cystic gall-bladder could thus be made. The patient also had an interesting appendix. Six years previously I had advised operation for appendicitis. The proximal half of the appendix was rather normal in appearance. The distal half was like a small plum, a little larger than the distal phalanx of a thumb. It represented a cystic remnant of an old perforating appendix. On freeing the tip from the mesenteric border of a nearby ileum loop the contents of the cystic appendix, a purulent slime, came partly out. There was a

cavity of 1 cm. diameter at the mesenteric border of this ileum loop.

Case II. The second case, which had been operated upon in the morning, showed a large gall-bladder, which we had to remove together with some liver tissue, as it was impossible to separate it from the liver. Two large and nine smaller acute perforating ulcers were the cause of this. It was an empyema of the gall-bladder with large stones. The pus was under great tension and let the gall-bladder appear very hard. The patient, a lady, was 64 years old. The two large ulcers were old and really healed, only representing diverticula-like depressions with a very thin wall. The nine small ulcers were all acute and from four to six millimeters deep. The area of these ulcers correspond on the outer side with the area where liver tissue had to be taken along with the gall-bladder. Thus we avoided spilling any of the pus.

Dr. J. G. Cross, presented a case of hypernephroma.

Mr. H. A. M., age 58, traveling salesman; of excellent family and personal history; rather overweight and somewhat florid. It was learned that he had consulted a physician because of an appearance of blood in the urine in 1917. The patient stated that he was cystoscoped, with no positive findings and the blood cleared up after two or three days. Patient stated that to his best recollection he was told that he had probably passed a small stone, and that he probably would have no further trouble. As the hematuria cleared up after two or three days and did not reappear, this was presumed to be correct.

In 1918 he was found to have a trace of albumin and a few hyaline casts in his urine, the diagnosis at this time being a mild chronic interstitial nephritis.

In December 1920, the patient noted a blurring of his vision. His physician, Dr. Willcutt, made careful physical examinations, including that of the urine, repeatedly, with negative findings. An oculist made one or more changes in his glasses which apparently did not help his vision, the blurring continuing to be slightly troublesome. The patient was otherwise well and continued at his occupation as traveling salesman.

On the evening of March 3rd he was one of a party at his club and ate heartily that night of a duck dinner. During the evening while playing cards with his brother and two other friends he evidently had a cerebral insult with a tonic convulsion. He was brought to Hillcrest Hospital in an ambulance, where I saw him at midnight with Dr. Willcutt.

Examination at that time showed that he was perfectly conscious and intelligent, but had a motor aphasia with partial loss of power in the right arm and leg with some relaxation of the facial muscles on the same side. Pupils were unequal, but reacted. There was a positive Babinski and Oppenheim on the right. No other reflexes were examined at that

time. Urine obtained at this examination showed a three plus albumin, no sugar, but was loaded with hyaline and granular casts. No blood was noted at this time. Examination of the urine the next day showed very marked improvement in the urine with a normal output, and in a few days an entire disappearance of both albumin and casts. Speech was entirely normal on the second day, and aside from a slight headache and weakness the only complaint was pain in the back which was attributed to trauma incident to his convulsion. The pupils continued unequal, but other reflexes were normal after the second day. Blood pressure was 150 over 95.

He remained in the hospital for about one week, and was apparently making an uneventful recovery. He went home and continued in bed for about six weeks. There was nothing noteworthy in his condition during this period except for a marked tenderness low down in the back. About this time patient began to have a very low temperature usually going up to about 100 in the afternoon. This lasted for about three weeks and no apparent cause was found. There was slight edema noted only in the middle third of both legs. The urine up until this time had remained practically constant, showing a specific gravity of 1020, and a trace of albumin, with no hyaline or granular casts, microscopic examination showing only an occasional pus cell. At about this time, however, for one or two days only the albuminuria was slightly increased, and granular and hyaline casts were again found in the urine. This condition, however, immediately cleared up again. From this time onward the patient began to complain of headaches which were increasingly severe. These headaches were distinctive in that they had their onset about 4:00 o'clock in the morning and would let up about noon, after which he would feel comparatively well for the rest of the day. They were located by the patient as over the temporal portion of the skull. There was a remission in his symptoms for two or three weeks, during which time he was more active than before—riding out, and even changing tires on his car. These attacks, however, returned with greater severity than before so that it was thought advisable on one occasion to give him morphin by hypodermic, but without any result. They were influenced slightly by aspirin or phenacetine.

The characteristic headache in the early morning and remission in the latter part of the day continued as before. Patient, however, had more nausea with his headaches, and lost in strength. Urinalysis at this time did not show any increase of renal symptoms. Blood chemistry never showed any retained nitrogen or increase of creatinin content. Wassermanns were always negative.

No greater complaint was made of vision, but ophthalmoscopic examination made by Dr. McCarthy and

myself showed such marked changes in the disc that an oculist was immediately called, who pronounced the condition one of beginning optic neuritis. Examination of his eyes from this time on showed progressive increase in this condition until the typical choked disc appearance came on in both eyes. Blood pressure varied from 120/90 to 170/110.

In view of the increasing headaches and the optic neuritis, Dr. A. S. Hamilton was asked to see this patient about the 25th of June, but he did not feel that there was sufficient evidence of brain tumor to justify operation, especially in view of the fact that there were no localizing signs of any kind. At this time, however, patient complained of difficulty in using the muscles of the right side of the face. To the observer, however, this was perfectly normal. X-ray plates were taken of the skull which did not show any signs of increased pressure. The condition became progressively worse and on July 9th patient became comatose. At this time he was again seen by Dr. Hamilton and also by Dr. Corbett, and a decompression was done the same night. Intracranial pressure was very great. Following the decompression patient was badly disoriented mentally, but had an auditory aphasia. For two days following the operation he passed a large amount of blood in the urine. This, however, cleared up after this time. Patient returned to his home after a stay of ten days in the hospital. He had marked bulging over the decompression area.

Examination on July 25th it was noted that the mental coordination was fair only; speech somewhat thick; hearing very poor (the mental coordination was so poor that we were unable to obtain satisfactory results from the Rinne and Weber tests). Left eye seemed somewhat protruded. Left corner of mouth drawn down. Reflexes of right arm definitely not as active as those of left. Muscular power of left less than right. Reflexes and muscular power apparently normal in both legs. Pointing tests normal. Blood pressure 120 over 70.

Condition continued about the same until August 5th when he was again operated by Dr. Corbett, who was, however, unable to remove the tumor. Patient died two days later.

Autopsy revealed an hypernephroma of left kidney as the primary growth. The brain tumor was of such size as to obliterate the left ventricle by pressure. Photographs of both tumors and microscopic study proved that the two tumors were similar and therefore associated, the brain growth being metastatic.

Dr. Henry L. Ulrich read a paper entitled "On Some Functional Tests of the Heart". Three charts were shown.

The meeting adjourned.

HARRY P. RITCHIE,
Secretary.

NEW AND NON-OFFICIAL REMEDIES

During November the following articles have been accepted by the Council on Pharmacy and Chemistry for inclusion in New and Nonofficial Remedies:

G. W. Carnrick Co.:

Amylzyme Capsules.

Merck and Co.:

Bromipin 10 per cent.

Iodipin 10 per cent. Tablets.

Powers-Weightman-Rosengarten Co.:

Theobromine-P. W. R.

Schering and Glatz:

Xeroform S. and G.

E. R. Squibb and Sons:

Diphtheria Immunity Test (Schick Test)—Squibb.

Diphtheria Toxin-Antitoxin Mixture—Squibb.

Eastman Barium Sulphate for Roentgenology.—A brand of barium sulphate for Roentgen-ray work—N. N. R. (see New and Nonofficial Remedies 1921, p. 58). Eastman Kodak Company, Rochester, N. Y.

Kalmerid Germicidal Tablets Potassium Mercuric Iodid.—Each tablet contains mercuric iodid 0.29 gm., potassium iodid 0.58 gm., ammonium chlorid 0.12 gm., eosin "Y" 0.0005 gm., and yields, when dissolved in water, potassium mercuric iodid 0.5 gm., with an excess of potassium iodid. For a discussion of the actions and uses of potassium mercuric iodid, see New and Nonofficial Remedies 1921, p. 198. Davis and Geck, Inc., Brooklyn, N. Y. (Jour. A. M. A., Nov. 12, 1921, p. 1573).

Iodipin 10 per cent.—An iodine addition product of sesame oil containing from 9.8 to 11.2 per cent of iodine in organic combination. It acts in the system similarly to the inorganic iodids. It is not broken up in the stomach, but a portion of the iodine is split off when it enters the intestine; the remaining compound is readily absorbed, and, as in the case of other fats is largely deposited in the tissues, where it is slowly split up. Because of this behavior the action of iodipin 10 per cent is exerted more slowly than that of the inorganic iodids. The dose is from 4 to 16 cc. (1 to 4 fluid-grams) three or four times a day. Iodipin is not marketed as such, but in the form of iodipin tablets 8 grains. Merck and Co., New York (Jour. A. M. A., Nov. 19, 1921, p. 1655).

Endocrinology and Pseudo-Endocrinology.—R. G. Hoskins, professor of physiology, Ohio State University College of Medicine, pleads for a greater degree of discrimination on the part of physicians in evaluating not only proper data but also the various agencies either seeking support in, or exploiting, this field. The latter aspect of the situation deserves special emphasis. Those who purpose acting as purveyors to the medical profession must accept the status of purveyors. The physicians or laboratory in-

vestigator of the medical sciences shall not exploit for commercial gain the result of his studies. At the present time a commercial campaign is being carried on by a "laboratory" purporting to specialize in endocrine products. The mail of physicians is flooded with a series of postcards, each card recommending and suggesting the use of the proprietary product of this self-styled laboratory for conditions ranging from eczema to epilepsy, and from obesity to tuberculosis. This free postcard advice is reinforced by reference to "monographs" and a trade journal in which scientific medicine is systematically belittled as unpractical. This advertising campaign is ostensibly under the supervision of the enterprising Mr. Hyde, the merchant of the firm. Mr. Hyde is a profound admirer of the eminent Dr. Jekyll, the medical director (Jour. A. M. A., Nov. 5, 1921, p. 1499).

Schick Test.—The entire absence of positive reactions to the Schick test in about one dozen children should lead to the suspicion that the particular lot of toxin used is inactive. It is not unlikely that toxin in small outfits may deteriorate after leaving the manufacturer (Jour. A. M. A., Nov. 12, 1921, p. 1594).

Estivin.—This is sold by Schieffelin and Co., New York. A request for a statement of the composition of this product sent to Schieffelin and Co., by the Council on Pharmacy and Chemistry, brought the indefinite and therefore meaningless statement that Estivin is an extract of Rosa Gallica containing no alcohol or foreign ingredients (Jour. A. M. A., Nov. 12, 1921, p. 1595).

Intravenous Compound (Löffler).—This is exploited by the Intravenous Chemical Company of Chicago. While physicians are asked to use this preparation and told of the profits to be derived from its use, they are not informed of its composition. From the analysis of this preparation in the A. M. A. Chemical Laboratory it was concluded to be a mixture of alkali chlorate and nitrate and boric acid probably produced by fusing together the constituents. Its composition is very similar to that of Oxychlorin and Zyme-oil, which were analyzed by the laboratory nearly fourteen years ago. Intravenous Compound (Löffler) is a nostrum of secret composition which physicians are asked to inject into the veins of their patients. It must be purchased in connection with some supplementary material, "a complete set of apparatus" sold by the same concern. Its successful administration is said to depend on following a technic detailed either in a booklet sent out by C. L. Löffler or given by him in a "post graduate course" which costs physicians fifty dollars unless they have purchased six dollars' worth of another nostrum "Thymozene." The intravenous administration of drugs is impressive. To the patient the technic and its psychic effects is striking. The dangers of intravenous medication are matters of record, and yet physicians are asked to administer this preparation, the composition of which

and the effects produced by it are unknown to him (Jour. A. M. A., Nov. 12, 1921, p. 1591).

Iodin and Goiter.—According to Marine, if the iodine store in the thyroid is maintained above 0.1 per cent no hyperplastic changes and, therefore, no goiter can develop. The studies of Marine and Kimball show that simple or endemic goiter can be prevented by the administration of from 3 to 5 mg. of iodine twice weekly, over a period of a month and repeated twice yearly. Is it not time for the medical profession to give special attention to this? If prevention of goiter is good preventive medicine, it is better preventive surgery (Jour. A. M. A., Nov. 12, 1921, p. 1574).

Midol Headache Tablets.—Midol was analyzed in the A. M. A. Chemical Laboratory in 1912. At that time the chemists reported that Midol was sold in the form of tablets and to contain amidopyrin (first introduced as pyramidon) as their essential constituent. Amidopyrin is a pyrazolon derivative related to antipyrin, and it has no place in preparations for self drugging (Jour. A. M. A., Nov. 19, 1921, p. 1674).

Seleni-Bascca.—A campaign of free publicity is carried on for an alleged remedy for cancer. The press agent material has been of two kinds—for medical journals and for newspapers. That for medical journals has been sent out on the stationery of the Medical News Bureau, 77 Seventh Ave., Brooklyn, N. Y., D. E. Woolley, Manager. The items sent out to medical journals stated that the "Basic Cancer Research" had been organized to develop a treatment of cancer by the use of selenium and tellurium. The material received by newspapers was sent out by the "Cosmopolitan Cancer Research Society," 847 Union St., Brooklyn, (the same address as the Basic Cancer Re-

search). The secretary of the Cosmopolitan Cancer Research is D. E. Woolley. The name of the preparation which the Basic Chemical Corporation puts out is Seleni-Bascca. A specimen, labeled "SELENI-BASCCA a mixture of Colloidal Selenium in tablet form", was examined in the A. M. A. Chemical Laboratory. The tablets were found to contain only about 1.3 per cent of selenium, and the product was not colloidal as claimed. The composition of Seleni-Bascca resembles that claimed for Sulpho-Selene, a preparation reported on by the Council on Pharmacy and Chemistry some years ago, but it contained no bile salts (a constituent claimed to be present in Sulpho-Selene.) (Jour. A. M. A., Nov. 19, 1921, p. 1672).

Serum for Pernicious Anemia.—"Ph. Rahtjen, A. M., Ph. D." Pasadena Calif., informs laymen that he has immunized goats against the germ of pernicious anemia and that patients have responded favorably to the "serum". Reference to medical literature does not disclose just what Rahtjen's serum is, and a search of American medical literature for some years past fails to disclose any publication by Rahtjen on any subject. In 1917 the Rahtjen Tuberculosis Sanatorium, San Francisco, Calif., exploited the Rahtjen Cure for Tuberculosis with the claim that "the remedy seems to cure tuberculosis in all its forms with equal celerity and certainty"; and yet people are still dying of tuberculosis. In 1920, so the newspapers had it, Rahtjen was offering a "New-Life Fluid" which was a long step forward to counteract old age. This was in March, 1920, yet people continue to grow old. According to recent newspaper accounts, Rahtjen is making his extract from Mexican bulls and cows; the first for males and the second for females (Jour. A. M. A., Nov. 26, 1921, p. 1753).

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ORIGINAL ARTICLES

THE GALLBLADDER AS A FOCUS OF INFECTION*

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That the gallbladder is a frequent source of focal infection is quite commonly known; yet, in looking up the literature on the subject one is surprised at its paucity. The teeth and tonsils, sinuses and eyes, and even the genito-urinary organs are recognized as frequent sources of infection by an abundance of literature. Yet the gallbladder is so often a source of focal infection that it warrants further recognition. The diseased gallbladder makes an excellent site for focal infection; it is filled with a purulent bile teeming with bacteria; its walls and mucous membrane are congested and inflamed and full of germs; the bile is often stagnant and very slow in being discharged on account of congestion of the cystic and common ducts as well as stones; it thus becomes a fruitful source from which infection and toxins are scattered throughout the body by the blood and lymphatic vessels. Lapenta says, "It is very easy in our consideration of the etiological causes of gallbladder lesions to underestimate the importance of chronic infections processes in these structures as focal infection factors capable of multifarious clinical manifestations. Thus we have seen numerous cases of chronic pancreatitis to be wholly dependent upon subinfection maintained by disease of the gallbladder. Cures have been symptomatically obtained in these cases by cholecystectomy".

Among the organs that are known to be affected as a result of gallbladder disease are the

liver, pancreas, heart, colon, and nerves as well as anemias and various rheumatic affections. Judd and Mann have shown by recent experiments that the pancreatitis frequently found in gallbladder operations is due to infection carried to the pancreas from the diseased gallbladder by the lymphatic vessels rather than through the common duct and pancreatic duct. Hepatitis is frequently caused by the infected gallbladder in a similar manner. Sir Humphrey Rolleston says, "It is now recognized that glycosuria or diabetes, if indeed any real distinction between them should be drawn, may be due to pancreatitis set up by infection associated with gallstones . . . The surgical treatment of certain cases of diabetes practiced by Sir A. W. Mayo-Robson is an illustration of preventive surgery as it aims at the removal of the cause before the resulting pancreatitis has reached an extensive stage."

The heart and vascular organs are sometimes affected by gallbladder infection in a serious manner. Rolleston says, "The dyspepsias due to appendix or gallbladder disease may be associated with heart palpitation, irregularity, and substernal distress. M. J. Lichty found that in appendix cases the cardiac disturbance was usually functional only, whereas in gallbladder disease either alone or combined with appendicitis the resulting cardiac disease was more serious. Absorption of toxins from an inflamed gallbladder or ducts may cause myocarditis, anginoid symptoms, and cardiac failure; in a paper on chronic cholecystitis as a cause of myocardial incompetence, Babcock records thirteen cases, medical advice being sought, with two exceptions in which biliary colic occurred, for cardiac disorder without any suspicions of gallbladder trouble. Angina or aginoid symptoms in patients with gallbladder disease may be due to exhaustion of the poisoned myocardium. An especially interest-

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ing case as it raises the question of Graves disease as a result of gallbladder infection is reported by Sears; a woman had an intense precordial pain spreading to the left shoulder, a raised pulse rate, and enlarged thyroid, and other symptoms suggesting Graves disease. An attack of biliary colic lead to operation and removal of two gallstones, and disappearance of all symptoms. Babcock describes a group of his cases in which attacks of angina preceded cardiac failure. The pain of biliary colic sometimes imitates angina and cases in which attacks of angina have cleared up after frank biliary colic are on record. . . . The symptoms of existing valvular disease may be intensified or compensation may be broken down by toxic myocarditis due to gallbladder infection. It is important to remember this and also that the cardiac weakness is often entirely due to gallbladder disease and will be cured by surgical treatment." Lapenta mentions as a result of gallbladder disease a secondary anemia of a severe type resisting all medical treatment but which was quickly relieved after cholecystectomy. These cases while more frequent when associated with common duct stones were also present in simple cholecystitis. These cases he says, "must not be confused with a hemolytic icterus. They represent a type of secondary anemia due to increased fragility of erythrocytes which is encountered after all chronic infections."

Colitis with prolonged and exhausting diarrhea is another infection sometimes caused by a diseased gallbladder and the cause of which is often very difficult to diagnose. These cases do not clear up usually until a correct diagnosis has been made and the offending organ removed or drained. In these cases the appendix is usually associated with the gallbladder. Another disease resulting from gallbladder infection is carcinoma of the gallbladder and liver, as a late result of prolonged chronic inflammation of the biliary tract. While the direct cause of carcinoma is unknown, evidence points to chronic prolonged inflammation or irritation as being an important factor.

I wish to give three case histories as illustrations of focal infection from the gallbladder.

Case No. I. Mrs. A. W., aged 49, married, American. Has had six babies and two miscarriages—last

pregnancy occurring eleven years before. Family history negative. She came to me in November 1918 complaining of a typical sciatic pain in her right leg. This pain had started in August 1918, and was located in the back part of right thigh extending from buttocks down the thigh to below the knee; pain was worse in the morning, and while easier in the afternoon did not entirely disappear at any time. She gave a history of slight attacks of pain over the appendix region for many years; had had attacks of vomiting and biliousness some years before, which were especially bad after menstruation. At the time the pain started in her right thigh she also had some pain in her right shoulder. Examination showed no abscessed teeth, healthy appearing tonsils; heart, lungs, kidneys, and pelvic organs negative. Wassermann test negative. Examination of thigh, leg and back showed nothing. On abdominal examination there was marked tenderness over McBurney's point and some muscular rigidity. There was also present tenderness and rigidity in upper right quadrant of abdomen but to a lesser degree. Operation was advised but refused, and medical treatment tried. After several weeks of medical treatment the pains in her leg became so severe and continuous that she was willing to try anything to get relief. On January 2, 1919, operation showed a chronic appendix buried in adhesions, and a gallbladder containing a stone one half inch in diameter. Both appendix and gallbladder were removed, and convalescence was normal. Before leaving the hospital the pain in her leg had entirely disappeared and she has had no recurrence.

Case No. II. Mrs. D. S. P. American, aged 37, married, had three children, no miscarriage, family history negative. She came to me in May 1919 on account of sciatic pain in right thigh which was increasing severely all the time and making it difficult for her to do her work. History showed she had some lung trouble about twenty years before—possibly a beginning of T. B. Ten years before she had typhoid fever and was very sick. Since that time she has been troubled repeatedly with attacks of pain in the right lower abdomen. The pain in her right leg had started one year before but had not been severe until lately. Examination showed negative teeth and throat; heart normal; lungs showed no active trouble; urine negative; pelvic organs negative. Examination of the back and leg showed nothing. Abdominal examination showed marked tenderness over McBurney's point, and a slight tenderness over gallbladder. No marked muscular rigidity. Barium meal showed no filling defect but an immobile cecum and marked tenderness over the appendix. Diagnosis was sciatica due to chronic appendicitis. Operation showed a chronic appendix which was removed. No gallstones could be felt either in the gallbladder or ducts though there were a few adhesions about the gallbladder; it was not markedly inflamed so we did not remove it. During convalescence the

pain in her leg was not as severe as before but did not cease. After her return home the pain in her leg increased and caused her a great deal of trouble during the next several months. Removal of the gallbladder was advised but she refused to have it done. At the present time she has no pain in her leg unless she becomes over tired or has been on her feet a good deal. But she still has a good deal of indigestion and stomach distress. I believe I made a mistake in not removing the gallbladder at the time of the appendix operation and that its removal would have cleared up the sciatica entirely.

Case No. III. Mrs. A. A. B. American, aged 29, married three years, never pregnant. Came to me on account of severe pains in the middle of her back, extending down across the sacro-iliac region, and down the back of right thigh and leg to heel. This pain started in the lower half of her back about four years ago while she was teaching. Eight or nine months later she had an attack of pain in the right side of the abdomen just below the ribs and her doctor thought she had an abscess of the neck of the gallbladder; electric treatment and diet were prescribed and after several weeks the pain in her abdomen stopped. The backache continued intermittently. During the past year the backache has been increasing and becoming much more constant and with it has come the pain extending down the back of her leg from the buttocks to the heel. These pains become worse after work or exertion and at times she says they are almost unbearable. These attacks of pain come on about once a month and last about a week, but have no relationship to her menstrual periods and apparently are not associated with menstruation, the latter being regular and painless. Family history negative; she had a severe attack of measles during infancy, and three years ago she had tracheitis with frontal sinus infection. This cleared up after the frontal sinus was drained through the nose and she suffered no more from that. Her teeth are perfect and tonsils small and contain no apparent infection. Pelvic examination negative. Stomach roentgen ray was negative. Abdominal examination showed a slight tenderness over McBurney's point and a very marked tenderness over the gallbladder; muscles of the right side of the abdomen showed a very decided rigidity and especially so in the upper quadrant. Examination of the back was negative. Wassermann test negative. Operation October 8, 1920, showed a chronically inflamed appendix which was removed. The gallbladder contained no stones but was decidedly inflamed and injected and was removed. Laboratory report showed marked inflammatory process of appendix and gallbladder tissues. Convalescence was normal. Relief from pain in the leg was almost immediate. The pain in the back continued for several weeks but gradually decreased in severity and since the first of the year she has had no pain whatever and is now feeling better than she ever did.

In conclusion I would add a word of warning—don't blame the gallbladder for too much nor too often. But there are undoubtedly some cases in which the gallbladder is a source of focal infection; in these cases operation will give decided relief.

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THE ETIOLOGY AND LABORATORY DIAGNOSIS OF ACTINOMYCOSIS*

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Actinomycosis is classified among the rarer of the infectious diseases. When a review of the mass of literature on the subject is attempted, however, it appears that the disease is either gradually increasing, or, as is true in other conditions, keener observation has brought about keener diagnoses, so that actinomycetes in man is not an uncommon finding.

The most notable collection of cases that has been reported in this country is that of Ruhrah, who collected sixty-nine cases reported in the United States up to 1900. One of the early important studies of the bacteriology of *Actinomyces bovis* is that by Wright.

The classification of actinomycetes bacteriologically has been the subject of considerable controversy. This is due to the fact that much confusion has arisen in this disease, as in other mycoses, from the inaccuracy of synonyms and the meager description of organisms reported by individual workers. A few attempts have been made to clear up this confusion by careful studies of the group, and of the biologic characteristics of various species. Breed and Conn, in a study of the nomenclature of Actino-

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mycetaceae, have recommended to the Committee on Characterization and Classification appointed by the Society of American Bacteriologists that two genera be recognized in the family, Actinomycetes, with *Actinomyces bovis* Harz as the type species, and *Nocardia* with no type species named. The first genus is intended to include the anaerobic pathogenic types, and the second to include aerobic species, primarily saprophytic in nature. Breed and Conn have in addenda to this report taken exception to a report by Merrill and Wade that appeared simultaneously with their first paper contending that *Discomyces Rivolta* is the correct term to use. Although *Discomyces Rivolta* has priority, *Actinomyces* Harz is given the place of preference through usage. This has been accepted by the Society of American Bacteriologists and the term *Actinomyces* has been added to their list of approved genera.

In our selection of cases in the American literature and in the Mayo Clinic series we have discarded cases of infection with acid-fast aerobic organisms as we believed that these should properly belong to the genus *Nocardia*, and have restricted ourselves to those cases which have been infected with the "ray fungus" or the actinomycetes of the bovis type. As a criterion for this standpoint we have the work of Wright and of several others, who have made more recent studies of the bacteriologic characteristics of the disease.

Colebrook, in England, has recently reported a very careful study of actinomycosis in man. He isolated twenty-one strains of actinomycetes of undoubtedly the same group. Two strains were evidently of a different group, and one strain was frankly different from the common type. In all, twenty-seven strains of actinomycetes were isolated in twenty-eight cases. This is a remarkable result inasmuch as the cultivation of *Actinomyces bovis* is by no means a simple bacteriologic procedure. The chief point in the cultural characteristics of all strains that are true to type is the strong preference for anaerobic growth, although some strains become capable of aerobic growth if subcultured in broth under a column of liquid paraffin. Glucose is usually necessary for a luxuriant growth of the primary culture. The optimum

hydrogen ion concentration is from 7.3 to 7.6. The viability of actinomycetes is slight. They are killed by exposure to 60° C for one hour, and surface cultures are reported by Colebrook as being sensitive to desiccation. Frequent subcultures tend to kill the strain. They are best kept alive in the ice box when cultivated on egg mediums and when kept moist.

Many divergent views are reported in the literature with regard to the source of infection. We shall not attempt to enter into this controversy. There are a few points of interest, however, in the various theories that have been presented. One of the most common ideas is that the ray fungus is conveyed to man from vegetable sources. Injuries with barley beards or the hard portion of grains or grasses, especially around the mouth, are commonly considered the sources of infection. The instances in which such injuries are reported in the literature are too numerous to mention short of a complete review of the history of actinomycosis. Colebrook, however, has called attention to the fact that there may be some skepticism regarding this view as the common organism which is found on vegetable sources is an aerobic fungus which does not usually conform bacteriologically to the type species which is used to describe the group. The anaerobic organism of the type *Actinomyces bovis* has not been demonstrated unquestionably in natural sources outside the animal body.

Another view that is gaining ground is that the organism is a natural inhabitant of the alimentary tract and that on certain occasions it is carried into the tissues and appears to establish itself there. There are two cases in the literature, one in England (Cope) and one in America (Mc Williams) of actinomycosis of the finger resulting from injury inflicted by an opponent's tooth in a fist fight. In both of these cases the inference is that actinomycetes was present in the oral cavity of a person who was not suffering from the clinical manifestations of actinomycosis and that the spores were carried into the tissues through the injury to the finger. Lord, several years ago, demonstrated in carious teeth and tonsillar crypts of normal persons organisms morphologically and tinctorially identical with *Actinomyces bovis*.

He was able to produce lesions in small animals by inoculation with the organisms which contained typical clumps of ray fungi. The question of the transference of actinomycetes from animal to man or from man to man has been raised by many writers, but direct proof of this form of transference has not been demonstrated satisfactorily. Indeed, when all the evidence is weighed the true method of infection has not as yet been clearly proved.



Fig. 1. (Case 34271). Sulphur bodies.

LABORATORY METHODS OF DIAGNOSIS

The chief diagnostic finding in actinomycosis is the presence of so-called sulphur bodies in the pus. These are macroscopic, and characteristic. While organized bodies in various pathologic conditions may, to a certain extent, simulate the actinomyces granule, the alert observer will be almost sure of his diagnosis when he spies one of the light yellow bodies being carried out in the pus of a discharging sinus (Fig. 1). In the preparation of slides for demonstrating the ray fungus we have found it convenient to use some fluid, either ordinary distilled water, or 20 per cent potassium hydroxid solution, to wash the pus cells away from the granules. This procedure is carried out on the microscope slide. The granule is then crushed with a cover slip and examined at

once with the low power of the microscope when the characteristic daisy formation is easily recognized (Fig. 2).

Clumps of inspissated pus have been mistaken grossly for sulphur bodies. However, such material is easily teased out in the distilled water on the microscope slide and disintegrated when a cover slip is placed over it, while the actinomyces granule is so well organized and matted together that sometimes considerable pressure is necessary in order to press it out for examination. The difference in refractivity between the colony and the surrounding material on the slide is very characteristic. When stained preparations are desired the pus is fixed on the microscope slide in the usual manner and stained with Gram's stain. The mycelia are gram-positive while the clumps are more apt to be stained with the counter stain. The filaments on an average are from 10 to 12 microns long, the clumps from 20 to 30 microns long and 8 to 10 microns broad.

The diagnosis of actinomycosis by culture is attended with some difficulty since *Actinomyces bovis* does not grow readily, even under anaerobic conditions. If many cultures are made it is possible to obtain growth from a small percentage of the sulphur bodies that are inoculated deep in the melted agar tubes (Fig. 3). Glucose is usually necessary for growth. We



Fig. 2. Crushed actinomyces granule.

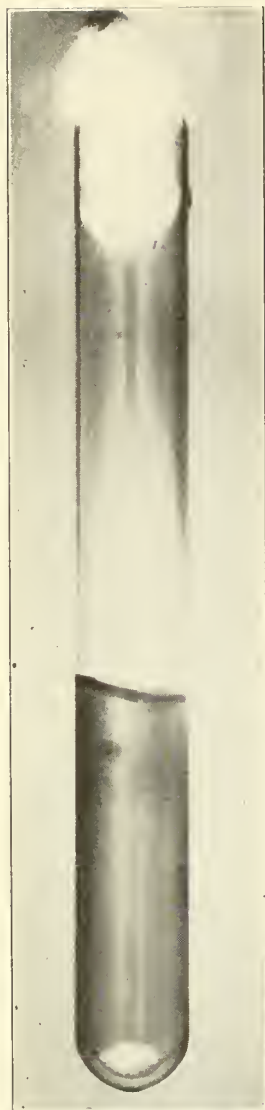


Fig. 3. Colony of actinomyces in glucose agar.

have had little success in subculturing primary culture.

Colebrook, who has met with so much success in England in isolating *Actinomyces bovis*, also reported the presence of peculiar accompanying bacilli in all of his cultures that he has called *Bacillus actinomyces* *comitans*. It will be interesting in the future to note whether this organism is reported as a common symbiotic organism with *Actinomyces bovis*.

The pathologic examination of the tissue in a carefully prepared specimen will reveal the characteristics ray fungus (Fig. 4). These are best demonstrated with the Gram-Weigert stain.

In discussing the laboratory diagnosis of actinomycosis mention might be made of the value of roentgenography. There is practically no positive value in this form of examination

in the ordinary case of actinomycosis since actinomyces does not involve bony structures. However in actinomycosis of the lung the shadow might reveal the location of a collection of pus. If ray fungi have been demonstrated in the sputum this will be of assistance to the surgeon in his operative procedures.

As a further study of *Actinomyces bovis* serologic tests might be mentioned. Colebrook has reported his observations on agglutinability and agglutinogenic properties of *Actinomyces bovis*, and calls attention to the fact that little is known on the subject. He states that patients heavily infected usually give coarse agglutination with his suspension of *Actino-*

myces bovis dilution of 1:500 to 1:4,000, a slight infection of the cervicofacial type failing to show agglutination. Similar coarse agglutination was obtained with serums from rabbits inoculated with a vaccine of *Actinomyces bovis*. It has not been demonstrated whether there are several serologic types of *Actinomyces bovis*. We are also interested in whether pure cultures of this organism may be used as antigens to demonstrate complement fixing bodies in infected individuals, and have planned some investigations of this nature. The possibilities of serology as a means of confirming diagnosis are suggested, although our interest in this subject is chiefly from the experimental standpoint.

We are attempting to review the voluminous literature on actinomycosis, but we believe that it is not feasible to discuss, in this paper, reported cases in detail. We do believe, however, that for the convenience of future workers all the cases reported in the United States should be collected. We shall report these in another paper, and shall refer here to 119 cases only that are reported to have occurred in the United States. The etiologic factors of these will be compared with the etiologic factors seen in the cases in the Mayo Clinic. Cases of actinomycosis of the head and neck that have been observed in the Clinic are being studied by New. New and Figi have reported three cases of actinomycosis of the tongue. Brogden has collected fourteen cases of intestinal actinomycosis diagnosed at the Clinic, and his report is ready for publication. Moersch is interested in infection of the nervous system with *Actinomyces bovis* and is about to report three cases that have been seen at the Clinic. Consequently the disease will not be considered from a clinical standpoint in this paper nor do we attempt to discuss methods of treatment.

The first diagnosis of actinomycosis in the Clinic was made in 1909. Since then, ninety-six cases have been diagnosed. The basis for the diagnosis in each case has been either demonstration of typical sulphur bodies in the pus coming from the lesion or the demonstration of actinomyces in the tissue by the pathologist. In many instances both criteria have been used for the diagnosis. On the whole each year

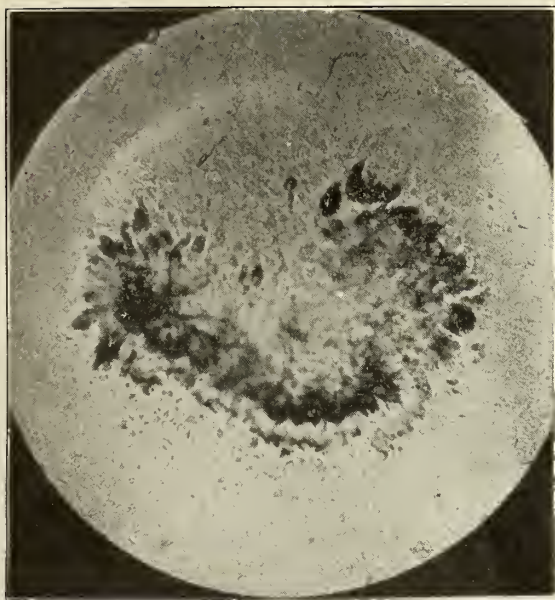


Fig. 4. (Case 210659). Actinomyces in tissue, showing mycelia and clubs.

shows more cases of actinomycosis than the preceding year, although this should not be construed to be an intimation that actinomycosis is increasing.

Actinomycosis is primarily a disease of the male. Eighty-four of our ninety-six cases were in males. Of the 119 cases collected in which the sex is stated, seventy-nine were in males. Thus it may be concluded that about 80 per cent of the cases occur in males. The reason for this is perhaps evident when suggested modes of infection are taken into account. If it is granted that the common mode of infection is from chewing or ingesting contaminated grass or straw, which is in reality a habit of outdoor life, it is obvious that the male is more often exposed than the female. Likewise, if infection occurs through contact with infected cattle, the male is more often exposed than the female. Quite often the females infected are wives of farmers, who possibly share with their husbands the outdoor life of the farm. It is also true that men are more prone than women to neglect the care of the mouth.

The distribution by age is striking. In our series of cases the large majority have occurred between the ages of twenty-five and forty-five years. The age incidence was practically the same in the 119 cases collected, so that it may

be stated that actinomycosis is primarily a disease of middle life. This may be discounted, however, by the fact that persons are most active in outdoor life at this age and may come in contact more often with the source of infection. No age seems to be exempt; in our series were patients of nine and of seventy-one years (Table 1).

TABLE 1

NINETY-SIX CASES OF ACTINOMYCOSIS IN THE MAYO CLINIC

Distribution by ages

Years	Cases
1 - 10	2
11 - 20	10
21 - 30	25
31 - 40	20
41 - 50	22
51 - 60	12
61 - 70	4
71 - 80	1

That occupation is a factor in the etiology of actinomycosis is quite evident, and has been noted by previous writers. In our series of ninety-six cases fifty-seven were in farmers (Table 2). In the 119 cases collected from the literature sixteen were in farmers (Table 3), but it should be stated that the occupation was not noted in one-fourth of the cases reported. It is likely that in this series, as in ours, infection among farmers predominates. The disease is noted also in stock buyers, ranchmen, stock raisers, leather cutters, and various men who come in contact with farm life and cattle. This again raises the interesting question with regard to the mode of infection. If it is through contact with contaminated cattle it is obvious that these men are more often exposed than any other group of persons. However, in many instances the patient had never come in contact with cattle either infected or not infected. If the infection is obtained from the bearded grasses the explanation of the predominance of the disease in farmers is obvious and of the occurrence of the disease in persons of various occupations who undoubtedly at some time in their lives come in contact with grasses. It is apparent from the long list of occupations of the patients with actinomycosis that association with the animal industry is not necessary to the infection.

It is difficult to draw conclusions concerning

TABLE 2

NINETY-SIX CASES OF ACTINOMYCOSIS IN THE MAYO CLINIC

Distribution by occupations	
Barber	1
Bookkeeper	1
Carpenter	2
Druggist	1
Engineer	1
Farmer	57
Farm implement dealer.....	1
Housewife	12
Justice (Court of Appeals).....	1
Laborer	5
Leather cutter	1
Machinist	1
Meat cutter	1
Merchant	1
Minister	1
Not known	1
Plumber	1
Rancher	1
Stock buyer	1
Stone cutter	1
Stock raiser	1
Telegraph operator	1
Tile mill worker.....	1

TABLE 3

CNE HUNDRED NINETEEN CASES OF ACTINO- MYCOSIS COLLECTED FROM THE

LITERATURE	
Distribution by occupation	
Butcher	1
Camp worker	1
Carpenter	3
Cattle dealer	1
Cattle raiser	2
Clerk	4
Coachmen	1
Conductor	1
Civil service man.....	1
Dairy maid	1
Drover	1
Factory hand	1
Farmer	16
Furrier	1
Housewife	9
Houseworker	1
Jeweler	1
Laborer	3
Laundryman	1
Lawyer	2
Machinist	2
Merchant	4
Miner	1
Operator	1
Photographer	1
Physician	1
Rigger	1
School boy	2
School girl	4
Section hand	1
Servant	1
Soda-water manufacturer	1
Stableman	1
Steam-boat captain	2
Stone mason	1
Teamster	1
Not stated	42

the distribution by states, because many factors are involved in reported cases. A patient may become infected in a different state from that in which he is resident, or the clientele of the physician who reports the case in a large measure determines the number of cases that are reported from a given state. In our series of cases most of the patients came from the middlewest and northwest states, (Table 4). These are, of course, the great cattle raising and farming states of the United States. It is interesting to note that few if any cases of actinomycosis are found among the many patients who come to us from the South and Atlantic coast and from the far West. In the collected cases New York leads with twenty-eight of 119 cases in which the residence is stated (Table 5). Several explanations may be offered for this. New York is a city of immigrants and many of these cases may be imported. It is not always clear from the reports that the disease had been contracted in New York state. Nineteen cases of the 119 were reported from Illinois; with those from Iowa, Wisconsin, and North Dakota, all middle western states, they constitute a large percentage of the remaining cases. Fifteen cases are reported from Massa-

chusetts. Most of these were from the Massachusetts General Hospital, in which also it is not always possible to determine where the infection was obtained. The impression is, however, that actinomycosis is far more prevalent in the middlewest and northwest states than in any other part of the United States, even making allowance for the fact that many cases diagnosed are not reported, and many cases are not diagnosed. This fact is even more forcibly brought home by an examination of the record for 1920 of the Federal Meat Inspection Commission of the United States Government (Table 6); the number of cattle retained on

viscus, but by sigmoid bends or by passing for a space between the mucous membrane and muscular layers of the viscus so that internal compression may block from backflow while it interferes but little with delivery. It is worthy of note that all tubes or ducts at the point of delivery are closed by muscle rings, while long tubes like the alimentary canal are encircled at each change in structure by automatic muscle rings. Practically all ducts and tubes deliver intermittently through the stimulus of content.

In jaundice, bile in the blood causes staining of the skin, conjunctiva, and tissues, as well as of the urine and unnatural fluids, although the secretion of mucus, milk, and saliva is not affected. The degree of jaundice is comparable with the degree of obstruction. In a study of the manner of the entrance of bile into the blood, Saunders and others experimentally caused jaundice by ligating the common duct of animals but when the chyle duct is ligated first, lymphatic absorption and delivery into the blood are blocked and jaundice does not develop. The absorption of bile depends on the presence of lymphatics in the liver, gallbladder, and ducts, and on the pressure or tension. Any cause which interferes with the delivery of bile into the intestine can cause jaundice, for example: absorption of bile in the liver as a whole or in its parts, caused by new growths; the development of connective tissue with atrophy, cysts, or the obstruction of ducts from within by any inflammatory and temporary swelling of mucous linings as the result of infection, cholangitis; acute or chronic diseases; or definite infections, such as malaria, yellow fever, acute yellow atrophy, and toxic jaundice in general; also from within, by concretions and parasites, and by direct closure from external pressure by enlarged glands or new growths. Anatomically, the common duct grooves the head of the pancreas; it penetrates the outer wall of the duodenum, passes indirectly through the muscle and between muscle and mucous membrane for a short distance, and, just before delivering into the free cavity of the bowel, unites, as a rule, with the pancreatic duct of Wirsung; the secretions from the gallbladder and the pancreas pass through the one outlet.

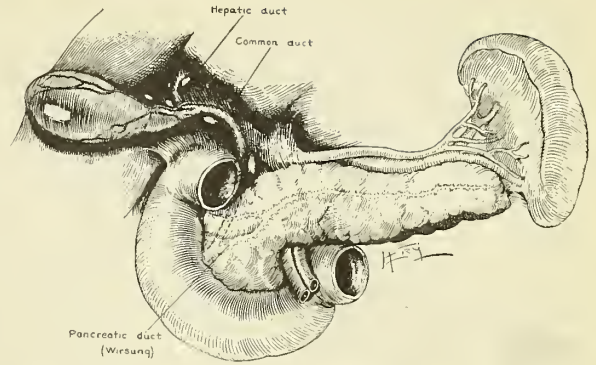


Fig. 1. Distribution of lymph nodes along the course of the cystic, hepatic, and common duct.

The area of the pancreas grooved by the common duct is covered by the duodenum with a more or less intimate attachment extending over one-third of the duodenal circumference. The important feature of this association of ducts is its variability; thus the pancreas may open through the same papilla and the duct be completely separated to the outlet or the two ducts may unite for a considerable distance as one duct. The two ducts, the pancreatic and biliary, may have separate openings, as in many of the lower animals. The usually larger duct of Wirsung may be the smaller, and the duct of Santorini opening between the pylorus and the common duct may be the larger. The two pancreatic ducts may not communicate in the head or in the body of the gland. In considering the relationship between the function of the liver and the delivery of bile in association with the function of the pancreas and the delivery of its secretion, is it possible that the union of the two ducts renders the pancreas more vulnerable to secondary infection following infection of the gallbladder and ducts? The function of the liver is essential; man could live but a few hours without it. Bile is a by-product of great value of the liver function; probably it provides the system, by way of the intestine, with a constant immunity against the temporary dangers that may arise from food and its accidental toxins. It emulsifies fats, lubricates the intestine, and favors peristalsis; its presence is noted by the color it gives the stool. We have observed several cases of jaundice for from many months to several years, in which there was no bile in the

intestine; the retention then of bile is of itself not a cause of death. We have observed the delivery of all the bile to the surface through a fistula for many months or several years; its retention or delivery into the intestine therefore is not necessary to life, not but that such conditions cause serious discomfort.

The condition or conditions which cause jaundice are of great importance in determining methods of treatment and prognosis. Inasmuch as the pancreas partially or completely surrounds the common duct, any case of jaundice, until differentiated, may be considered as possibly caused by the constriction of the latter. Temporary inflammation, sclerosis, and chronic disease, or new growths may be the cause. In a fairly high percentage of cases the pancreas is involved by varying degrees of inflammation associated with infection of the gallbladder and ducts; such a condition and the size of the lymphatic glands and the common duct should be recorded in all cases of operation on the gallbladder and duct for future reference in case of recurrence of disease.

The pancreatic secretion is of far greater importance than bile from a digestive standpoint, and two ducts were provided for its delivery. It is evident from reviewing the diseases of the pancreas and the surgical procedures developed for their relief that a small part of the normal secretion is sufficient as a hormone or activating agent to give very satisfactory digestive results. Within the pancreas are those very important areas of tissue, the islands of Langerhans, which largely control carbohydrate metabolism. Inflammation of the pancreas is not uncommon; it should undoubtedly be considered a chemical change caused by toxemia from alimentary intake in acute conditions, while subacute and chronic inflammations, which also are chemical in their effect on the tissue, should be looked on as the result of microbial action. From my experience in operations on the gallbladder and ducts and examinations of the pancreas I believe that most of the chronic diseases of the pancreas and a few of the acute diseases are secondary to infections of the gallbladder and ducts, and that a small group of cases of serious acute and chronic infections which cause symptoms do

not follow primary gallbladder disease, but that the conditions are reversed.

Disease of the gallbladder is now generally admitted to be the result of chronic infection of its tissues, with possibly, but not necessarily, some secondary infection of its contents. The empyema of total cystic duct obstruction is not caused by the same germs that cause the original cholecystitis. The former conception of infection of the bile and then of the gallbladder from infection reversed through the common duct, or the lymphatics, or the portal circulation by way of the liver, is less plausible than that infection is a direct result of attack through the blood by microbial infractions in the capillaries. While it is admittedly possible that the pancreas can be involved secondarily through the duct association, especially if bile can enter the pancreatic duct, it is more probable, according to modern investigations of routes of infection, that it also occurs through the blood. The more diseased the gallbladder is found to be on exploration the less is the probability that the pancreas is the cause of the trouble, and if it is involved the involvement is secondary: the reverse is true with great distention of the gallbladder and an unobstructed cystic duct.

The usual types of pancreatitis are: (1) the intralobular, in which the inflammatory process chiefly involves the outer part of the lobules, causing a lumpy irregular enlargement of the head or of all of the gland, and only in gross disease involving the islands of Langerhans; (2) interacinar pancreatitis in which the surface is smoother and the enlargement of the gland greater, and in which the diffuse inflammation more often involves the islands of Langerhans and is more commonly associated with glycosuria (the latter type often produces abscesses, and not infrequently is seen with fat necrosis); and (3) hemorrhagic pancreatitis which occurs as an acute condition of the abdomen associated with acute inflammation of the gallbladder and ducts with acute jaundice, but it is a secondary disease from bile in the pancreatic ducts, apparently rendering parts of the gland subject to autodigestion. The pain in some cases of so-called gallbladder disease may be attributed in part

TABLE 4

NINETY-SIX CASES OF ACTINOMYCOSIS IN
THE MAYO CLINICDistribution by states (United States) and
provinces (Canada)

Alberta	7
Illinois	2
Indiana	5
Iowa	11
Kansas ..	1
Michigan	2
Minnesota	7
Missouri	5
Montana	12
Nebraska	4
North Dakota	6
Ohio	2
Oklahoma	1
Ontario	1
Oregon	1
Saskatchewan	9
South Dakota	12
Texas	1
Washington	2
Wisconsin	5

TABLE 5

ONE HUNDRED NINETEEN CASES OF ACTIN-
OMYCOSIS COLLECTED FROM THE
LITERATURE

Distribution by states (United States)

Alabama	1
California	2
Colorado	1
Illinois	19
Indiana	1
Iowa	9
Kansas	1
Kentucky	1
Maryland	6
Massachusetts	15
Michigan	1
Minnesota	3
Missouri	1
New Jersey	2
New York	28
North Dakota	6
Ohio	3
Pennsylvania	4
Rhode Island	1
Tennessee	1
Virginia	1
Wisconsin	4
Not stated	8

account of actinomycosis indicates that the disease is encountered much more commonly in the middlewest slaughter houses than in other regions of the country. Not only is this true in absolute numbers, but also relatively. Absolute conclusions cannot be drawn from this table because the source of the cattle in each instance is not known. As a general rule, however, cattle are not shipped farther than is necessary for good market conditions, and thus most of the cattle in the middlewest slaughter houses are from the middlewest, while in the slaughter houses in the south and east are eastern and southern cattle. Etiologically these facts may be interpreted in two ways; that the most infection among cattle results in most infection among man through direct contact, or that actinomyces is present in nature more in the west than in the east, and men and cattle are more often exposed. The result in either case would be the same.

In a letter from one of the physicians connected with a large packing plant in Chicago he states:

"It has been our observation that the so-called western grass-fed cattle from such states as Montana, New Mexico, Arizona, Texas, Kansas, North Dakota, South Dakota, Wyoming,

Utah, Colorado, and parts of Nebraska, are more frequently affected with actinomycosis than those that are fed on corn in Illinois, Wisconsin, Iowa, and Indiana. We are quite sure that this has been the experience in the packing industry in general."

This physician further suggests that it may be that because range-fed cattle remain outdoors nearly the entire year, travel in herds, are wilder, and are subject to injury around the jaws in fights or by wire fences that they are more susceptible to the natural source of infection.

The distribution of the disease according to anatomic location, and to the duration of symptoms in the cases in the Mayo Clinic is shown in (Table 7). From this it will be seen that lesions in the head and neck occur nearly twice as often as in other parts of the body. Next in number are the cases of the appendix and cecum. However, almost any part of the body may be involved. In general, the same may be said concerning the cases collected from the literature (Table 8). The conclusion is inevitable that the alimentary tract plays a very important part in the source of infection. This

TABLE 6
ACTINOMYCOSIS IN CATTLE—FEDERAL MEAT
INSPECTION REPORT, 1920

	Cattle killed	Cattle retained for actino- mycosis
Augusta, Ga.....	5,255	0
Baltimore, Md.	94,953	429
Boise, Idaho	1,902	11
Boston, Mass.	77,346	191
Brooklyn, N. Y.....	59,279	211
Buffalo, N. Y.....	115,609	694
Burlington, Vt.	4,194	0
Chicago, Ill.	2,155,913	40,401
Cincinnati, O.	181,059	1,205
Cleveland, O.	128,377	513
Dayton, O.	14,004	24
Denver, Colo.	120,127	3,739
Detroit, Mich.	70,931	421
Dubuque, Ia.....	7,904	29
Fort Worth, Tex.....	391,609	6,373
Haverhill, Mass.	1,176	0
Indianapolis, Ind.	195,672	1,261
Jersey City, N. J.....	75,292	980
Kansas City, Kans.....	1,214,480	30,749
Lewiston, Idaho.....	1,263	13
Los Angeles, Calif.	115,154	341
Louisville, Ky.	15,396	58
Milwaukee, Wis.	106,539	460
National Yards, Ill.....	587,763	6,875
Newark, N. J.....	22,599	76
New Orleans, La.....	70,923	131
New York, N. Y.....	433,228	4,314
Oklahoma, Okla.	264,829	1,498
Omaha, Nebr.	938,147	19,271
Paterson, N. J.....	1,605	9
Peoria, Ill.	12,638	52
Philadelphia, Pa.	104,204	263
Pittsburgh, Pa.	55,221	460
Portland, Ore.	39,308	113
Richmond, Va.	9,226	33
St. Louis, Mo.....	194,039	1,475
San Diego, Calif.....	9,325	648
San Francisco, Calif.....	64,355	149
Seattle, Wash.	54,855	718
Sioux City, Ia.....	310,813	15,228
So. St. Joseph, Mo.....	412,305	7,503
So. St. Paul, Minn.....	301,958	14,883
Spokane, Wash.	30,598	277
Toledo, O.	1,985	0
Washington, D. C.....	13,437	19
Wheeling, W. Va.....	14,058	25
Wichita, Kans.	18,574	931
Entire Country	9,709,819	176,456

immediately preceding the onset of the disease is mentioned. Immediately following extrac- tion of a tooth the lesion appears in the region of the jaw or submaxillary gland. The dura- tion of symptoms before the patient presents himself is, contrary to the usually accepted idea, rather short. In six cases of our ninety- six the history was under one month; in two of these only ten days had elapsed after choking over a barley beard before the lesion appeared. Practically all patients with lesions of the head and neck presented themselves within twelve months and most of them within six months. The period of symptoms was practically the same in the other cases. However, the majority of the patients with actinomycosis of the cecum and appendix presented themselves after from one to five years. Evidently the disease is usually acute or subacute, except in the cecum and appendix, where it is chronic. The incuba- tion period is very difficult to determine be- cause it is almost impossible to obtain a history of definite injury, or inoculation.

In conclusion we wish to emphasize that

TABLE 7
CASES OF ACTINOMYCOSIS IN THE MAYO
CLINIC

Anatomic distribution and duration of symptoms

	Less than one month	One to six months	Six to twelve months	One to five years	Five years and more	Unknown	Total
Abdominal wall.....	..	1	1	..	..	..	3
Appendix	..	2	3	8	1	..	14
Chest	..	2	..	..	..	..	2
Epigastrium (liver?)...	..	..	..	..	1	..	1
General	..	..	..	1	..	..	1
Head and neck.....	4	34	18	3	1	1	61
Liver	..	..	1	..	..	..	1
Liver and breast.....	..	..	..	1	..	..	1
Lung	..	..	1	..	1	..	2
Lung and neck.....	..	..	1	..	..	..	1
Mediastinum	..	1	..	..	..	..	1
Parotid gland and spinal cord.....	..	1	..	..	..	..	1
Scrotum	..	1	..	..	..	..	1
Temporal region, spinal cord, and lung.....	..	1	..	..	..	..	1
Testicle	..	..	1	..	..	..	1
Thigh	..	1	..	..	..	..	1
Tongue	2	1	..	..	..	..	3
	6	45	26	13	5	1	96

is striking in the details of the case histories in almost all of which a tooth or tonsillar trouble

actinomycosis, while an uncommon disease, is not so rare as many imagine. In a patient with an acute or subacute infection of the cervico-facial region, especially if there has been dental trouble on the affected side, or a history of definite injury, this disease must be suspected. A differential diagnosis must also be made in those types of abdominal lesions in which a sinus persists after drainage of an abscess. The careful examination of the discharge in either type of case for characteristic sulphur bodies will lead to the correct diagnosis clinically, which is readily substantiated by simple laboratory procedures.

While the biologic characteristics of the causative organism and its place in the vegetable world has been defined, the etiologic factors concerned in the production of infection in man or beast are not known. It is, therefore, still of interest to report accurately all details regarding cases of actinomycosis and thus stim-

ulate further research in the life-history of actinomyces.

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DISCUSSION

DR. GORDON B. NEW, Rochester: A few words concerning clinical actinomycosis of the head and neck may be of interest. We have had sixty-five cases in the last few years, many of which had been overlooked elsewhere because a clinical diagnosis was not made. The physician who drained the phlegmon did not look for actinomycosis. Previous to a year and a half ago I was not looking for actinomycosis of the tongue but since that time we have seen three cases and that is true of actinomycosis in general. One must be looking for the sulphur body at the time the phlegmon is drained. A few pictures will show the types to be found, and I will have some thrown on the screen.

In demonstrating the sulphur body it is well to examine the new pockets. In pockets that have been drained and have a lot of secondary infection, it is difficult to demonstrate them. Many cases are taken for tubercular glands of the neck or sarcoma of the jaw. The condition spreads, usually, superficially although at times there is deep thickening of the neck. In some cases there are tumors as hard as a malignant growth. One patient came in with a three months' history of difficulty in opening the mouth, and acute pain. The physician had diagnosed a malignant growth. One patient came in with a malignant tumor, but probably was inflammatory.

TABLE 8

ONE HUNDRED NINETEEN CASES OF ACTINOMYCOSIS COLLECTED FROM THE LITERATURE

Anatomic location

Abdomen	2
Appendix	7
Arm	1
Cecum	1
Chest wall	2
Coccyx	2
Colon	1
General	3
Gluteal region.....	1
Head and neck.....	62
Intestine and liver.....	1
Liver	1
Lumbar region	1
Lung	16*
Lung and abdomen.....	1
Lung and chest.....	1
Mediastinum	1
Omentum and intestine.....	1
Ovaries	2
Pelvis	5
Peritoneum	2
Ribs and vertebrae.....	1
Right iliac fossa.....	1
Skin	1
Thumb	1
Tonsil	1

*Many of these are probably nocardiosis rather than actinomycosis.

Three months later the man returned and we found actinomycosis.

Another case was a bilateral actinomycosis of the neck which had been taken for Hodgkin's disease. Some cases have had bilateral glands of the neck and have been treated for tuberculous glands. One man was operated on for malignant thyroid.

One patient came with a history of six months' difficulty in opening the jaw. We gave him ether and could not demonstrate any reason for the difficulty. A few months later we found the sulphur bodies in a phlegmon in the parotid region. The man died six months after he was first seen; the condition apparently originating in the tonsils or about the teeth.

I think that the slides I have shown demonstrate that a clinical diagnosis of malignancy must be made guardedly. I believe many of the mistakes in diagnosis are due to the fact that physicians do not look for sulphur bodies when the phlegmon is drained. In most cases the correct diagnosis is overlooked, the condition being mistaken for malignant tumors such as Hodgkin's disease, sarcoma, and so forth, or simple phlegmons following tonsillectomy or removal of teeth, tuberculous glands, and so forth. I believe a guarded opinion should be given in tumors of the head and neck that are probably malignant but might be actinomycosis.

DR. N. L. LINNEMANN, Duluth: I am interested in this subject because about a year ago I had occasion to see a case of actinomycosis. There were broken down tumors and we were able to discover the fungus very readily. The man had had the infection for about two months when we saw him and claimed to have been infected by a dog that scratched his face. We had a dog team through here at about that time, known as the Klondyke dogs and some of them died. We had the patient under observation for some time and there was no doubt about the diagnosis.

DR. MOSES BARRON, Minneapolis: I wish to mention one procedure in the diagnosis of actinomycosis, which has not been touched upon in this paper. I am referring to the microscopic examination of the tissue removed from the wall of the lesion. I have seen a number of cases where this has proved of great service. In one case, at the St. Paul City & County Hospital, a clinical diagnosis of carcinoma of the base of the tongue had been made, because there was a brawny, indurated mass in the region just above the larynx. The infiltrated tumorous mass was incised, and portions of the tissue were removed for histological examination.

Microscopically, the tissue showed extensive chronic inflammation, which, on very careful study, revealed several small rosettes of the ray fungus. Without this microscopic study of the tissue, the correct diagnosis would have been overlooked, as there were, as yet, no discharging sinuses and no macroscopic pus. One should always curette out

small pieces of tissue for histologic study, as this alone may reveal the fungus, in cases where the discharging pus may show none of the characteristic "sulfur" granules after the abscesses had become secondarily infected with various contaminating bacteria.

SUSPENSION AND TRACTION IN TREATMENT OF FRACTURES OF EXTREMITIES*

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History: Suspension and traction in the treatment of fractures of the extremities have been used for many years. In a review of the history of this subject we read that in 1819, Daniell of Savannah, Ga., applied the weight and pulley to obtain permanent extension. In 1855, Vaningen of Schenectady, N. Y., elevated the foot of the bed to obtain counterextension. Adhesive straps applied to the leg to obtain adequate support for extension were first used by Sargent of Philadelphia. This method was adopted and popularized by Buck, sometime before 1852. He, in 1857, also adopted the elevation of the foot of the bed to obtain counterextension.

During the Civil War the genius of John T. Hodgen produced the splint that bears his name. This splint served advantageously both for suspension and the dressings of compound fractures. Working at this period in Liverpool, was a surgeon whose work on fractures was a great advancement in medical knowledge. The Thomas leg splint was first reported by him about 1879, and it is this splint which today is the most serviceable for suspension and traction.

Some years ago, Ransohoff advocated the use of icetong callipers applied to the condyles of the femur to obtain traction. Later the Codavilla and Steinman pins were designed and used for continuous extension. The Finochietti stirrup on the other hand was designed for temporary traction only, but Chutro, as associate of Finochietti in Buenos Aries, has since utilized it for continuous traction.

*Presented before the Minnesota State Medical Association, Duluth, Minn., August 1921.

In recent years, because of surgical necessities during the war, these various methods have received greater attention and through the work and teachings of Jones, Blake, Speed, Teas, Moorhead and others, some of these methods have, in a measure, been standardized. The oration on this subject given by Doctor Joseph Blake before this body one year ago, and the remarkable results that he showed, has given us a special interest in this subject.

Adaptable by general practitioner: These methods have been used largely in centers where especially trained men are available. The question arises as to whether or not these methods may be adaptable to the use of the general practitioner and the man in remote districts. Of the many fractures occurring in all parts of the country comparatively few can be treated in special institutions. It is our belief that these methods can be used by the average man. Each village has a blacksmith and a carpenter, and these are the only crafts necessary for the making of splints, fracture frames, etc. With proper direction this work may be done very satisfactorily, quickly and at a minimum cost.

Advantages and disadvantages: Suspension and traction may be used in all cases of fractures of extremities with deformity or overlapping of fragments. It adds greatly to the comfort of the patient and to the ease of nursing. By it, we can maintain reduction for any type of fracture, easily care for the wound if compounded, and obtain earlier restoration of function. This is due to early mobility of joints, thus allowing minimum adhesions of muscles and joints to form.

The only disadvantage is, that it confines the patient to his bed. This is especially irksome to the patient in cases of fracture of arm or forearm.

Suspension apparatus: The apparatus for suspension consists of the Balkan frame, or any of its modifications, the essential parts of which, are two upright solid frames at the foot and the head of the bed connected above the bed by a longitudinal bar. Attached to this longitudinal bar are adjustable pulleys, best arranged in form of trolley to permit greater motion of the limb and more comfort to the

patient. These pulleys should be smooth running, thus avoiding undue friction. The longitudinal bar should be adjustable on the upright at the head and foot of the bed. This frame is very simple and takes but a short time to construct. It may be built either of wood or metal, and made adjustable to fit any kind of hospital bed. The limb is directly suspended by metal frame or canvas bands, to which is attached ropes running through the pulleys above and attached to sufficient weight to counterbalance the weight of the limb. The limb is thus suspended in the air and permits a large range of motion to the remainder of the patient's body. The Thomas splint is now universally used for suspension of the limb. It is easy to construct and can be adapted to use either on the upper or lower limbs.

Traction: According to Jones, traction of the limb must be divided into one or the other of two groups, depending upon whether the counterextension is supplied by the weight of the patient's body or by the backward extension of the splint on the tuberosity of the ischium and buttocks. Similarly in traction of the upper extremity, the counterextension is either the body of the patient or the backward extension of the splint against the shoulder and axilla. In the lower extremity the utilization of the body weight is counteracted by elevating the foot of the bed. In our experience with fractures of the femur the fragments are better immobilized where the counter-extension is supplied by the backward extension of the splint on the tuberosity of the ischium.

There are two methods of obtaining traction: either by direct application to the bone (so-called skeletal traction); or by application to the skin surface with adhesive material. Each method has its advantages and disadvantages and whichever method is used depends upon the individual case. The direct application to the bone is more efficient so far as traction is concerned, but it has the objection that it requires an open operation and exposes the patient to a certain risk of infection. It is contraindicated where there is danger of contamination from an infected wound.

Skeletal traction: This skeletal traction is obtained by anchorage to the bone by the use of the pin the ice-tong callipers, and the stirrup.

The application of these requires the same aseptic technique as any operation. A general anesthetic is usually advisable in the application of the skeletal apparatus and the manipulation of the fracture.

We believe the Steinman pin to be the most useful of these methods in treating fractures of the lower extremities. It permits a firm anchorage to bone and does not present the danger of slipping or tilting. It may be applied above the condyles of the femur, in the head of the tibia, above the ankle joint and either over or through the os calcis. Any steel pin sharpened at one end may serve the same purpose, but if it is threaded so as to unscrew in the middle both halves of the pin may be removed without danger of contaminating the wound. In its application the skin is pulled up on one side proximal to the direction of traction and a small opening made to the bone with the knife. The pin is inserted in this opening and forced through the center of the bone transversely and out against the skin on the opposite side, which is again pulled taut and an incision made in the skin to release the pin. Traction apparatus may then be attached to the pin by the ordinary calliper or any strong wires. The pin may be inserted in the head of the tibia in cases of low fracture of the femur, or over the os calcis in case of fracture of the bones of the leg.

The ice-tong callipers may be applied above the condyles of the femur to obtain traction for fractured femur. We have found them also very serviceable in fractures of the leg bones. In such cases they are applied just above the malleoli, great care being taken that they do not come too low and enter the ankle joint. In placing the tongs, the technique used is similar to that used in placing the Steinman pin.

The Finochietti stirrup is confined in its use to traction on the os calcis and as first constructed was for temporary traction to reduce fractures of the leg, but later was popularized by Chutro for permanent traction. We believe its use in this country is very limited. We have not used it, but show it as a matter of interest.

Skin traction: The surgical principle of accomplishing most in the least radical manner

should apply to this method of traction treatment of fractures. Skeletal traction is a radical procedure and exposes the patient to infection; it, therefore, should be avoided when possible. The use of adhesive applied to the skin for adequate support to obtain extension has been universally used with varying results. The objection to this method being the inability to obtain a glue that would stand the stress of traction and also not cause injury to the skin.

Zinc oxide adhesive material is the least satisfactory. It is frequently used because it is usually at hand and is easily applied. In almost all cases it produces blistering of the skin. The injury to the skin is a source of undue irritation to the patient and soon this method of traction must be discontinued.

The Sinclair formula of glue or adhesive material, if properly made and applied, is very satisfactory. It can be applied without first shaving the parts and is easily removed by the use of moist heat. Experience shows, however, that it is likely to cause blistering of the skin early in the treatment.

Recently Cunningham has described a formula for glue in traction which we have found very suitable and now use entirely in our cases. As described by Cunningham, it consists of a solution of celloidin in acetone. The celloidin material may be obtained in bulk from a supply house, but we have found the celloidin in discarded x-ray films to be very satisfactory. The gelatin emulsion is dissolved and washed off with hot water leaving the clear sheet of celloidin. The required amount of celloidin and acetone is placed in a dry, clean, wide-mouthed bottle and securely stoppered. The bottle is then vigorously shaken or agitated at intervals, and the solution is ready for use in twenty-four to forty-eight hours. When properly made it should be an almost clear, homogeneous, syrupy fluid. When applied the skin should be clean and dry. The part should not be shaven for the hairs increase the efficiency of the adhesive, like hair in plaster. A layer of the solution is rapidly put on by a brush. The quantity should be sufficient to soak through the strip on which traction is to be applied. Canton flannel is the best material for strips. After sufficient time has elapsed

for evaporation of the acetone and drying, the straps are then ready for traction. We have found that this adhesive causes no blistering and stands the stress of extension a satisfactory length of time.

As accessory apparatus in this method of treatment we must mention the use of the glove and Sinclair skate. In cases of low fracture of the forearm or in fractures with open wounds of the forearm, the gloves may be used very satisfactorily to obtain extension. The hand is first painted with glue and then the glove put on. After drying, traction is made on the fingers of the glove. If the extension is not slackened each day to allow motion of the joints, there is a great danger of developing stiffness of the fingers. We have not had satisfactory results in the use of permanent extension in cases of fractures of the forearm. The amount of traction in the fracture was small and the apparatus was never comfortable to the patient.

The Sinclair skate is an ingenious device which may be used very satisfactorily in lower fractures of the leg, or those involving the ankle joint. It consists of a board somewhat longer and wider than the foot. In its center is a longitudinal slot so that a transverse bar is attached by a bolt and adjusted to any position. The edges of the board contain several notches. Straps are glued to the sole and sides of the foot and curtain rings so attached to these, that there is a row on each side of the foot. The board is fastened by passing tapes through the rings and over the board. The position of the foot may then be regulated by changing the transverse bar in the longitudinal slot of the board.

Care and after treatment: This treatment is a great source of comfort to the patient and allows early mobility of the joints. To maintain this and to obtain proper results requires untiring personal care of the patient on the part of the physician. This should consist of careful observation of the case once or twice daily. All complaints of the patient should be given immediate attention, and it may be necessary to adjust the apparatus at frequent intervals, if the comfort of the patient is to be insured; more padding may be required over tender areas to prevent injury to the skin, and if any deformity or undue abduction or adduc-

tion exists, this should be corrected. In case of fracture of the middle third of the femur one is very likely to get a sag of bone at the site of fracture unless careful observations are made and gravity considered. There are many ingenious and useful devices for preventing foot drop. These consist in strapping the foot to an upright support attached to the Thomas splint or by the use of adhesive strap attached to the Thomas splint or by the use of an adhesive strap attached to the sole of the foot and suspended by a rope to the weight and pulley.

The position of the fragments and the amount of extension are best accurately observed by roentgenographs and this by the use of the portable x-ray machine. There are few portable x-ray units used by physicians, but a dental x-ray apparatus may serve the same purpose.

When treating fractures it should be remembered that the part consists of other structures besides bone. The patient may have good position of fragments and a firm bony union, but still have poor function because of stiffness of joints and atrophy of muscles. Suspension of the extremity aids circulation and relieves swelling. Massage should be started in all cases within the first few days after injury unless contraindicated by infection. Mobilization of joints should also be started at the earliest possible time, but only after one is sure that the fracture is immobilized. Often with correct apparatus and proper instructions, the patient may be able to do his own mobilizing. In this connection the Pearson modification of the Thomas splint is very useful. This device is attached to the Thomas splint at the level of the knee joint and the leg rests in it. It is so constructed that when the patient, by use of a rope and pulley elevates or lowers the device, the leg is extended or flexed at the knee, thus preventing stiffness of the knee joint. In fractures of upper extremities similar apparatus is used allowing mobility of the joints. In fractures of the humerus the suspended forearm permits of a small degree of flexion and extension at the elbow. The hand is free, allowing motion of wrist and fingers.

This mobilization and massage should be used early, not to restore mobility, but as a preventive measure to insure that joints which have not received injury maintain their mo-

bility and that the muscles are kept in as good condition as circumstances will permit. Once stiffness has occurred in a joint, the work of restoring the mobility becomes tedious and disappointing.

The last step in the treatment of fractures of the lower extremities is to get the patient to walking as early as possible. To do this requires some form of splint that will permit weight bearing before bony union is firm. The Thomas walking calliper or its modifications serve this purpose. It is so constructed that the weight of the body is carried directly from the tuberosity of the ischium to the socket in the heel of the shoe with no weight on the leg. These splints are rigid at the knee but the heel socket permits ankle motion. The side rods may be solid and of correct length, but by inserting a turnbuckle the rod may be lengthened or shortened to fit any case. This splint may be used in all fractures of femur and fractures of leg bones.

SUMMARY

1. Although suspension and traction treatment has been used for several decades, it is only during and after the recent war that there has been some standardization of the method.

2. It is a source of comfort to the patient; reduction can easily be maintained and earlier restoration of function is obtained.

3. The method is adaptable to the use of the general practitioner. The apparatus may be constructed quickly and at a minimum cost.

4. Extension may be obtained by either skeletal or skin traction.

5. This method requires the untiring personal care of the patient by the physician.

6. Massage and passive motion should be started as early as is consistent with immobility of the fracture

REFERENCES

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2. Cunningham, W. F.: *Jour. A. M. A.* Sept. 27, 1919, p. 973.

DISCUSSION

DR. A. J. BRADEN, Duluth: I think it is a discredit to American surgery that the idea of suspension-traction that was so perfectly worked out by Hodgen should have been allowed to fall into disuse to be revived by foreigners in the Balkan war, and later during the great war.

We now learn from these foreigners the great advantages of this treatment, and we see it accepted by

the highest authorities in the treatment of shaft fracture, and it seems to me it would be well for our American writers to take cognizance of the work that has been done in this country and give the credit where it belongs.

During the past two or three years there has been an enormous amount of literature on the subject of fractures and the suspension-traction treatment of them. Almost every form of fracture has been subjected to this treatment and sometimes perhaps without very much judgment as to whether it was the proper method or not. Of course, that is something that occurs a great many times when some new method of treatment comes to the attention of the profession. Any method for the treatment of fractures should be so simple and practical that anyone at all skilled can carry it out. Many of the methods suggested for the suspension-traction treatment of fractures are complicated and difficult to carry out and only suitable for use in an institution where the closest attention can be given. In this the value of Dr. Ide's paper can be seen. He has worked the matter out very conservatively and practically and in a way that almost anyone can understand.

One use of this method—I do not know that Dr. Ide mentioned it—is in displacing of operative treatment of fractures of the upper and lower extremities. Fractures that resisted all ordinary methods of reduction three or four or five years ago, would have been considered proper cases for operative treatment, but can now be subjected to the suspension-traction treatment, and operative procedures avoided.

Furthermore, I did not notice he mentioned the use of suspension-traction method of treatment in cases of vicious union where there is considerable overlapping of the fragments. In these cases the fractures can be thoroughly mobilized by open method, and instead of applying other methods of fixation, suspension-traction can be applied and the wound in these cases can be closed at once, and thus you do not have to subject the patient to further operative procedures. Through the traction the contracted muscles are overcome, and by arranging the line of traction, the parts fall into natural position. I think when this can be done there is a great deal saved for the patient and also for the surgeon.

I think the doctor has mentioned most of the advantages that come from this method of treatment. I wish to say that I think traction with tongs and pins is no more painful and brutal than the external application of traction, which is applied more to the muscles and skin and tendons. There is really less pain with tongs and pins when properly applied than other methods of extension. One thing should be remembered, in applying tongs the skin should be drawn upwards and then applied in position so there is no tension on the soft tissues. This method of treatment is only suitable in a very limited number of cases of fractures of the arm.

In the majority of cases other methods are less

complicated, more comfortable for the patient and secure as good or better results.

DR. L. DAUGHERTY, St. Paul: I think Dr. Ide is to be congratulated on his paper. It is timely and interesting. There is no question but what the suspension-traction treatment of fractures is the treatment par excellence in many of these cases. Although it was used many years before, it came into popularity during the war. I was taught its use some fifteen years ago by Dr. More. Many of these appliances and splints shown by Dr. Ide are not as complicated as they look. Our hospitals are not properly equipped to treat fractures. That is not the fault of the hospital, but it is the fault of the attending staff. Personally, I derive a great deal of pleasure and satisfaction in making my own splints and my own traction apparatus, and it is not difficult to do. I do not agree with Dr. Braden, as I think this apparatus can be used in the home and in the country as well as in the hospital.

In a recent attempt at self-criticism, in reviewing some 500 fracture cases, I tried to find where my mistakes had been and why some of my results were not satisfactory and I reached the conclusion that the fault was not due to the method but due to my own personal negligence. I did not inspect these fractures often enough. I do not know of any branch in surgery where, it seems to me, that success lies more in frequent inspection than it does in the treatment of fractures.

Just one word more. In fractures of the forearms, and in fractures of the upper arm, I wish to recommend the local anesthetic method, the injection of the brachial plexus as worked out by Kulenkamp. It is a simple procedure. When you inject the brachial plexus you have complete anesthesia of the arm and you are able to reduce these fractures without any pain whatever to the patient.

DR. M. S. HENDERSON, Rochester: We are indebted to Dr. Ide for bringing this phase of the subject of fractures before our notice, and I wish to congratulate him on the manner in which he has done so. I also agree with Dr. Daugherty that from a theoretical viewpoint at least it is a treatment par excellence. From a practical view point, however, I wish to say that I agree with much that Dr. Braden has said. That is, that all of us cannot carry out this treatment. The chief difficulty is that constant attention is necessary. I feel that Dr. Daugherty is unnecessarily taking the blame for some poor results that he says has followed the use of this method. It is not possible for anybody to be in constant attendance to see that the proper traction and alignment are held. In large institutions, with fracture wards and trained attendants, the treatment can be carried out probably very efficiently. I think that many of these fractures should be operated upon. I do not by any means think that all should be operated upon. I find that in my own service I

am using the open operation more and more and have found that beef bone screws and plates have been of great aid. They are less irritating to the tissues than metal and if you obtain anatomical alignment, apply the plate with the screws, and then put on a suitable plaster of Paris cast, you are sure of a perfect result. If you get a perfect anatomical result, you can practically be sure of a good functional result. My part in this discussion is not to advocate the open treatment for all fractures, as stated before, but I do think that we are leaning now a little too much to the conservative treatment, and under the proper surroundings and with the necessary equipment in recent fractures good results can be obtained by the open operation that might have given bad results by conservative measures.

DR. EMIL S. GEIST, Minneapolis: I wish to thank Dr. Ide for his excellent paper. I want to speak briefly of two points. I see quite a number of cases of old fractures. I have been called in a number of times to defend doctors in malpractice suits in cases of fracture. Fractures are a fertile field for malpractice suits, and as a result of my experience in this field of work I should like to make the suggestion that fractures are as a rule, serious conditions. It would be well for any one who has a fracture to deal with to call in a consultant. No matter who the consultant is, a consultation may stop a lot of malpractice suits in fracture cases.

The other point I wish to speak of is one of an historical nature. While the doctor was reading his paper I was wondering just where this suspension-traction plan of treatment of fractures really originated. A Frenchman by the name of Lucas Champougniere years ago wrote a large book on this subject. A German by the name of Bardenhauer also wrote a large book on this subject.

A Scandinavian in the nineties of the last century wrote on this subject very completely and thoroughly and, of course, in the Balkan war, from which we get the name Balkan frame, this method of treatment was frequently used. It is an excellent method. However, it requires considerable ingenuity on the part of the man who is handling it. He must have great anatomical skill and must know what he is doing to apply it successfully.

The open method is a splendid one in obtaining anatomical and as a rule good functional results. It is a two-edged sort of knife and unless we are absolutely sure of our asepsis, it is better to get some shortening than to get an infected fracture.

DR. C. W. MORE, Eveleth: For the past thirty years, we have used the Hodgen extension-suspension method, more or less, in the treatment of fractures of the leg. The first few years we had no hospital facilities and used it at the patients' homes, ordinary boarding houses and shacks, or wherever they might be. Good alignment and functional results were obtained in the majority of cases, but the anatomical position of the bones, as shown by the x-ray

years later, in some of the cases was not so satisfactory.

Dr. Daugherty has emphasized the point that the closed treatment of fractures requires constant care. Where the conditions are such that open treatment cannot be carried out, the method that has been outlined by the essayist is to be recommended. It can be used by anyone with a little ingenuity and some mechanical knowledge.

DR. A. W. IDE, Brainerd, (closing): A decided effort should be made to standardize the treatment of fractures. A few years ago we could get out our old Scudder and put up our fractures according to the methods described. Now these descriptions are to be found only in the literature. It is not as easy to follow these newer methods. Moreover the average man must follow the method that is generally considered good practice. The courts may review his work.

Can the patient be treated in large fracture wards? There are no large fracture wards. Cook county, Massachusetts General, Bellevue, and Montreal General have large fracture services, but in most of the large institutions there is no fracture service. This work is divided up among different men. In the more isolated communities the general practitioner must treat these people. There is no one else to do it. Is there any reason why a patient in the country with a fractured femur should not be brought to town in a Thomas splint, placed in a boarding house and treated there successfully?

There were many interesting points brought up in the discussion. I want to thank the members for discussing our paper so freely.

THE PRIMARY LESION IN CANCER*

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We, as a profession, especially during the past decade, have more and more learned to develop a bird's eye view of disease. We are diagnosing and treating disease now not so much from the standpoint of symptoms as from its etiology. In a case of arthritis, we think not only of the swollen, painful joints, but we examine tonsils, teeth, sinuses, urethra, etc., for the primary focus. In tuberculosis of bones, tendons and lymphatics, we are not now satisfied until we have carefully examined the lung for evidence of a primary lesion. In fact, almost any lesion which we can attribute directly

to some type of infection, should be looked upon as a secondary metastatic process and the original focus determined and eradicated if it still exists.

Malignant disease, at least clinically, in many respects resembles infections. One of its constant features is that it always has a primary focus, an initial lesion, from which it spreads into regional and distant parts of the body. This lesion consists of cell proliferation in a lawless manner. Its growth does not conform to any of the laws of tissue development, but penetrates in an in disorderly manner into the surrounding structures and, if left alone, eventually destroys life. What produces the growth we do not know. We do know, however, that in order to produce a cure, it must be removed while it is still a local or at least a regional disease.

If such a lesion is located on or near the body surface, it should not often be overlooked. It is surprising, however, how often a metastatic lesion in the deeper parts may be treated as primary when a relatively superficial primary lesion is self-evident. It not infrequently happens that tumors, especially of the bones and lung, engage the attention of the clinician to the extent that he entirely overlooks primary lesion, which at that time may be very obvious in the thyroid, prostate, kidney or breast. While associated in one of the large Chicago Clinics, I can recall having on my service at one time three cases of metastatic carcinoma of the neck of the femur, with pathologic fracture in which the primary tumor a carcinoma in the breast, had been entirely overlooked. This, of course, can be attributed only to lack of a thorough examination or unfamiliarity with the pathologic process.

Of recent years, we have developed to a high degree of efficiency endoscopic examinations. This has enabled us to recognize lesions in the lower bowel, bladder, vagina, throat, nose and accessory sinuses at a date early enough to be of some definite service to the patient. I believe, however, that these examinations too often are neglected. Every year the writer still has several cases come to the hospital and dispensary service sent in for hemorrhoids when a low proctoscopic or even a digital ex-

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amination at once reveals an advanced carcinoma. Too often suppositories, douches, nasal sprays and urinary sedatives are prescribed without a preliminary examination. It therefore occurs that the early primary lesion in these relatively hidden away places is not discovered in time to produce a cure and treatment henceforth becomes symptomatic.

There is a class of malignancies, however, hidden away in the deeper structures which may for a long time give neither local nor general evidence of their presence. It is this class that I particularly refer to as hidden cancer. They are found almost entirely in the gastrointestinal tract and its communicating ducts. Statistics tell us that approximately fifty per cent of all cancers occur in this hidden area. Most of these are recognized too late to reach the primary lesion before it has metastasized into distant parts. Many of these cases during their incipency, complain only of vague symptoms. Some consult their physician for a metastatic growth without having had at any time symptoms from the hidden primary tumor. In the majority, however, there are symptoms, though vague they may be, which demand a thorough investigation.

With careful x-ray, chemical and physical examinations and even in some instances, on suspicion, exploratory operations, we will be able to recognize a greater proportion of cancers at a time early enough to operate on the initial lesion. Many of these cases, however, are operated when a physical examination would reveal superficial metastases in the glands which at once renders such a major procedure entirely unnecessary except for symptomatic relief. Extensive operations on the stomach and bowels are not infrequently performed when a small metastatic supraclavicular gland is present. On the other hand, many superficial metastases are operated thinking they are primary when they are only a superficial evidence of a deep-seated, perhaps unrecognizable, primary lesion.

Since it is a definitely established fact that in order to cure cancer we must eradicate the primary lesion, we should always keep this in mind and determine, if possible, whether we are dealing with primary or secondary foci.

There are numerous cases in which the pri-

mary lesion is entirely overlooked, some of which are never discovered without a careful post-mortem examination. During the past few months, several of these have come under my observation and will serve as illustrations:

Case No. 19449. Male, age 54. Admitted to the University Hospital July 21, 1920. He gave a history of always having been well up to the present trouble. During the last part of April 1920, his daughter noticed a nodule the size of a hazelnut just above the clavicle on the left side. This grew rapidly and in about two weeks, reached the size of a baseball. When it was first noticed, he consulted a physician, who gave him some ointment to apply, without result. Two weeks later, he consulted another physician who gave him electric treatment—probably x-ray. Under this the growth became smaller. He had no pain, but occasionally noticed a little difficulty in swallowing. During the next two weeks, his voice became husky.

Physical examination was negative, except for a large mass about the size of a fist in the left side of the neck, just above the clavicle. This mass was smooth, freely movable and not adherent to the skin. The urine was negative, hemoglobin 75 per cent; W. B. C. 7,500; differential W. B. C. normal; blood pressure 105/60; Wassermann negative.

Laryngoscopic examination revealed extensive edema of the glottis on the left side, with a slightly hemorrhagic appearance of the mucous membrane.

July 26, 1920, he was operated and an attempt made to remove the mass which was found to be very extensive and adherent to all the vessels and nerve trunks in that region. During the operation, the patient had great difficulty in breathing and at one time, stopped altogether and was carried under artificial respiration for twenty minutes. After the operation, he still had difficulty in breathing. On the following day his temperature rose to 105 and he died during the night.

Microscopic examination of the tumor mass proved it to be squamous cell carcinoma. July 28th a complete post mortem was performed, which revealed the following positive findings:

Pleural cavity right lower lung obliterated by adhesions.

Early diffuse bronchial pneumonia in left lung.

Lymph nodes in upper part of abdomen markedly enlarged. A few enlarged nodes at bifurcation of trachea.

The larynx had marked edema of the entire left side. This terminated very abruptly at the mid-line and the right side appeared normal.

In the deep folds of the pharynx on the left side, was a large ulcer, measuring about two cm. in diameter. This showed ulcerated edges and marked induration of the tissues around the ulceration. Microscopic examination proved this to be a squamous cell carcinoma—the primary lesion from which metastases had taken place into the left supraclavicular glands.

Case No. 15450. Male, age 50. (Laborer. Personal, past and venereal history negative. Came to Surgical Department of the University Dispensary on November 5, 1920, complaining of enlarged glands at both sides of neck and slight difficulty in breathing.

He gave the following history: March 1920, first noticed an enlargement in the right cervical region. This gradually enlarged. In June 1920 he noticed a little difficulty in breathing through his nose. In July 1920, slight enlargement of glands in left cervical region. In August 1920, consulted a physician, who incised and drained the enlarged glands on right side of neck. No pus was found; but after a week, began to discharge a little pus. He was given a nose spray to relieve his breathing.

Physical examination revealed enlarged glands in both sides of neck, more marked on right than left. Aside from this, his physical examination was negative.

Blood: hemoglobin 80; R. B. C. 4,500,000; W. B. C. 11,800; differential W. B. C. normal; Wassermann negative; urine negative.

November 11th, x-ray of chest was negative for tuberculosis and Hodgkins disease. X-ray of sinuses revealed a haziness of both maxillary region—no evidence of involvement of bone structure.

November 13th, gland removed from neck for diagnosis. Microscopic examination revealed squamous cell carcinoma.

November 22nd, nose and throat consultation revealed ulcerating carcinoma below the right middle turbinate in the posterior nasal region, close to the fossa of Rosenmuller. This was evidently the primary focus from which he had cervical metastasis.

Case No. 20216. Male, age 53. Farmer. Admitted to the University Hospital November 16, 1920, with a mass in his left abdomen and a hydrocele on the left side. His family, past and venereal histories were negative. His present illness dated from February 1920, when he had influenza with pneumonia and was confined to bed for several weeks. At this time he began, upon several occasions, to notice sharp pains in his left upper abdomen.

July 1920, while lifting a heavy sack of corn, he felt a sudden severe pain in his left groin. Two days later he noticed a swelling in left scrotum. In October 1920, he first noticed a mass in his left abdomen. He then consulted his family physician who advised an x-ray examination.

Physical examination revealed the following positive findings: Loss of weight twenty pounds; large mass over descending colon, extending from anterior, superior spine to costal margin—hard, nodular, not movable, did not move with respiration. Liver palpable, felt nodular. Hydrocele in left scrotum size of orange—transmitted light. One single gland size of acorn in left supraclavicular region—felt hard, not adherent or painful. He said this had been present since July 1920. Some dullness over base of right lung.

Blood: hemoglobin 75 per cent; W. B. C. 7,900; dif-

ferential W. B. C. normal; blood pressure 140/80; blood and spinal fluid, Wassermann negative. Blood sugar, urea and creatinin normal.

Ureteral catheterization revealed extra-ureteral obstruction on left side—hydro-ureter above obstruction. Clear urine obtained from kidney. Functional test practically normal. X-ray of chest revealed evidence of old pleurisy base of right lung. X-ray of bowel revealed partial obstruction with filling defect at juncture of descending colon and sigmoid.

December 7, 1920, left supraclavicular gland was removed for microscopic examination. This proved to be a squamous cell carcinoma, evidently metastatic from the primary lesion in the colon. An abdominal operation was therefore ruled out. The result was obvious and the patient was sent home. His primary tumor and metastases continued to grow and he died March 28, 1921.

Case No. 19851. Male, age 63. Admitted to University Hospital September 21, 1920, with the following history:

Personal, past and venereal histories negative. He was well until the winter of 1919, at which time he began to notice some pain in his left arm and shoulder. This gave him trouble occasionally and gradually increased in severity. November 1919 noticed a small gland the size of a pea in the left supraclavicular space; by February 15, 1920, it has reached the size of an egg and his left arm had become swollen and stiff.

He consulted a physician who removed the mass. Following this, he had some improvement of the pain in the arm, but soon noticed a mass appearing just to the right of the old incision, which continued to grow. He had gradually lost weight and suffered intense pain in his left arm and shoulder.

Physical examination revealed a large mass in the left supraclavicular fossa. Mass was hard, nodular and not movable. Left axillary glands palpable and hard. In the abdomen there was a palpable mass six cm. below the costal margin to the right of the mid-line—tender and painful. Hemoglobin 70 per cent; W. B. C. 7,200; Wassermann negative. Urine negative. Case was obviously an inoperable malignancy. He grew gradually worse and November 21, 1920 died.

A complete postmortem was done, which revealed the following positive findings: The pancreas showed replacement of the head portion by a very firm tumor mass about six cm. in diameter which irregularly invaded the surrounding tissues and faded off imperceptibly into the mid-portion of the pancreas which was firm and somewhat atrophied. The tumor was firmly attached to the inferior vena cava, at one point having grown through the wall. There were numerous very hard lymph nodes along the aorta and along the pancreas. There were large, metastatic, cancer nodules throughout the liver, kidneys and adrenal glands. There was a large metastatic tumor at the root of the left side of the neck involving the first rib and clavicle. Microscopic ex-

amination of these revealed carcinoma. The primary lesion was in the pancreas and the deep metastasis in the liver and kidney had occurred later. The superficial evidence was the enlarged left supraclavicular gland.

Case No. 20217. Female, age 32. Admitted to the University Hospital November 16, 1920 with the following history: About September 11, 1920, felt occasionally a few sharp pains in the left lower abdomen. The abdomen had gradually become larger and since she had not menstruated since September 15th, it was thought that she was probably pregnant.

November 6th, while lifting a pail of water, she had sudden severe pains in the left lower quadrant. This was followed by diffuse tenderness and marked enlargement of the abdomen. A physician was called, who made a tentative diagnosis of ruptured ectopic pregnancy.

Examination revealed the following. The abdomen was very much distended, apparently filled with fluid. There were some hard nodules in the left upper quadrant. Vaginal examination revealed some small, hard masses in the cul-de-sac. Hemoglobin 77 per cent; R. B. C. 4,500,000; W. B. C. 13,700; differential W. B. C. normal; blood pressure 120/70; Wassermann negative. Urine negative.

She gradually became worse and an exploratory laparotomy was performed November 18th. A lower abdominal median incision was made. The abdomen was filled with a sero-sanguinous fluid. The parietal and visceral peritoneum was covered with miliary tubercles. The uterus was soft and about two months pregnant. There were massive adhesions in the upper abdomen and the omentum was adherent to the anterior abdominal wall.

Diagnosis of miliary tuberculosis was made and the abdomen closed.

After the operation, she continued to fail and on November 26th died.

A complete post-mortem was performed with the following positive findings: Upon opening the peritoneal cavity, there was marked thickening of the peritoneal coat. Both visceral and parietal layers were covered with numerous miliary nodules. The loops of the intestines were bound together and could be separated with difficulty. The upper abdomen was one mass of adhesions. The surfaces of the spleen and liver were covered with miliary nodules. A diagnosis of miliary tuberculosis was made. Upon more careful examination of the organs, a primary tumor was discovered in the stomach. There was a depressed area, measuring 2 by 4 cm. evidently the site of an old ulcer. This was very hard and upon microscopic examination, proved to be carcinoma. Upon further investigation, the nodules in the omentum and throughout the peritoneum, proved microscopically to be carcinoma.

Without a thorough investigation, this case would have passed as abdominal miliary tuberculosis.

Case No. 19631. Female, age 61. Admitted to the University Hospital with the following history. Oc-

tober 1919, she had a sudden severe pain in her left eye, lasting only for a short time. That evening, when she attempted to read, the pain returned and she discovered she was entirely blind in the left eye. Following this, she was better until April, when the pain returned, accompanied by severe attacks of nausea and vomiting.

August 18, 1920, she was admitted to the University Hospital for glaucoma. August 20th, left eye was enucleated and for some time, the right eye was treated for glaucoma and iritis.

October 15, 1920, she began to have severe attacks of pain in the region of the gall-bladder and examination revealed a soft mass extending down from the costal margin. This seemed tender and there was marked muscle spasm over it.

Hemoglobin was 70 per cent; W. B. C. 7,500; differential W. B. C. normal; Wassermann negative; blood pressure 116/68. Urine showed a few hyaline casts. X-ray of stomach normal.

October 25, 1920, an exploratory operation was done. Free bloody fluid was present in the abdomen and the liver was studded with metastatic tumor nodules. The gall-bladder was contracted and hard. A diagnosis of primary carcinoma of the gall-bladder was made and the case considered inoperable.

Patient grew gradually worse and died November 9, 1920.

A complete post mortem was done, which revealed the following findings: Hemorrhagic bronchial pneumonia—both lungs. Old tuberculous cavities in right apex. Liver was filled with tumor nodules throughout. Many of nodules black in color—others grayish, with black mottling. Gall-bladder filled with stones. No evidence of tumor in gall-bladder or stomach. The primary lesion could not be found and upon microscopic examination, it was found that nodules in the liver were melanotic sarcoma. When this was revealed, the eye, which had previously been removed in August, but not sectioned, was now opened. A tumor mass was found in the region of the attachment of the optic nerve. This was dark, almost black in color and grew forward into the cavity of eyeball and almost filled the posterior chamber. Microscopic examination revealed it to be a melanoma of the eye, the primary focus from which distant metastases had occurred.

From available world-wide statistics, it would seem that cancer is definitely on the increase. We are in a cancer age. Extensive experimental data have been accumulated, but so far have done very little to lower the mortality. I am impressed with the necessity of thorough clinical investigations, of careful records made of histories, examinations and operations and, above all, more thorough, complete post mortems, with evidence carefully compiled by competent pathologists.

RESULTS IN THE TREATMENT OF INFLAMMATORY DISEASES OF THE GALLBLADDER AND ITS DUCTS*

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The following paper is an inquiry into the causes of failure in the treatment of certain types of gallbladder conditions. It is based upon a review of hospital records and an attempt has been made to determine what the logical treatment should be in those cases where failure has taken place. In arriving at definite conclusions as to the results obtained in the treatment of inflammatory diseases of the gallbladder and its ducts, it is essential to recognize that we are oftentimes dealing with a different symptomatology in different patients. Jacobson¹, in his report of 397 cases observed at the Peter Bent Brigham Hospital, finds that gallbladder disease is associated with four groups of symptoms and he has divided them into the following:

(1) Cases with typical biliary colic, as described in the text books.

(2) Cases with atypical biliary symptoms where there is a dull aching pain in the upper right quadrant, accompanied by fever, nausea, vomiting and sometimes jaundice.

(3) Cases with gastric symptoms. Here there is an epigastric distress or sense of fullness after meals, which is relieved by belching of gas or by vomiting, and associated with quality food dyspepsia.

(4) Cases where there is a combination of typical biliary colic and gastric symptoms.

In giving his results as to operative treatment, where he discusses the relative merits of the various surgical procedures, he fails to give any idea as to the group which shows the least improvement, except to mention that in sixteen cases, a cholecystectomy was done on a gallbladder which proved to be normal on microscopic examination. They were cases with vague gastric symptoms and of these, six considered themselves worse than before operation.

Inasmuch as cholecystitis is now considered as being due to an infection which is elective in nature, the trend of treatment is surgical. However, the earlier types of cases should be treated medically over a fairly long period—according to Oschner² and Mayo³. This consists of a careful dietetic regime and the selection of foods which are not apt to produce distressing symptoms. Included in this is the searching out and eradicating of all foci of infection, whether in the tonsils, teeth or sinuses. In the advanced cases and in those failing to respond to medical supervision, surgery is indicated. The published statistics all point with overwhelming evidence to the fact that cholecystectomy is the treatment of choice. This is amply illustrated by the experiences of Jacobson¹, Judd⁴, Deaver⁵, Mayo³ and Adams⁶. These writers also point out that failure to obtain good results after operation are due to recurrent, persistent infection, either in the gallbladder that has previously been drained, or in the common duct. Judd⁴ says that recurring symptoms are due to infection in the liver as well as in the gallbladder or ducts, for he states—"Infection in the liver, gallbladder or ducts is the most frequent cause of secondary trouble and may occur many years after the primary operation."

In looking over the records of the Warren Hospital for the past three years and reviewing the cases of gallbladder disease which came to operation, the writer has attempted to determine which group of patients is apt to give the poorest response to surgical treatment and to note the degree of pathology present; also, the length of time it takes to recover sufficiently to do ordinary work.

In all cases coming to operation, a thorough abdominal exploration was done and in addition, the appendix was removed if the patient's condition permitted. Ninety-two patients were operated upon and of these, two died as a result of the operation; one who had a gangrenous appendix at the time of operation died from a broncho-pneumonia on the fifth day and the other from a pulmonary embolus on the tenth day.

Sixty-six patients have responded to our inquiries as to their present condition and of

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these, fifty-five had cholecystectomies and eleven had cholecystotomies. Of the fifty-five who had their gallbladder removed, thirty-six considered themselves cured, twelve improved and seven unimproved. Of the eleven who had simple drainage of the gallbladder, four were cured, five were improved and two were unimproved. In going over the histories of the forty cases that were well and had no complaints, thirty-three gave histories of acute attacks of abdominal pain and had considerable pathology present; one had a dull aching pain under the ribs and six had reflex symptoms. Of the seventeen that were improved, four gave histories of acute attacks of pain, three had a dull aching pain and ten had reflex symptoms. Of the unimproved cases of which there were nine, one was misdiagnosed and turned out to be a cord tumor with radiation of pain under the right costal border, the remaining eight complained of reflex gastric symptoms.

The length of time it took until the cured or improved cases felt that they were as strong as before operation varied from three to eighteen months. A few of the improved patients felt real well but stated that they could not digest certain foods as they caused bloat-

ing, heartburn and belching of gas. These symptoms, they considered of such great import that they could not class themselves as cured. This reveals that the reflex gastric symptoms are the persistent symptoms, but the patients who have had other symptoms such as severe attacks of colicky pain oftentimes forget the slight inconvenience of gastric disorders after being relieved of the major complaint. The patient, on the other hand, who comes in complaining of gastric symptoms entirely, and in whom the abdominal exploration is negative excepting for a kinked appendix, a thin walled gallbladder covered with filmy adhesions, larger than usual, and with an occasional enlarged gland near the cystic duct, is very apt to return with the original symptoms.

Of the twenty-four patients whose major complaint was the stomach, only six were cured, ten improved and the remaining eight were unimproved. In the eight unimproved cases, there was gross evidence of pathology. Some of the gallbladders were rather thick and were of the strawberry type with enlarged lymph nodes along the cystic duct, while a few were of the large thin walled kind with an enlarged gland or two along the duct. In those of thin walls, the fundus showed little evidence of infection, but along the cystic duct, there was infiltration of lymphocytes and eosinophiles.

What were the causes of failure in the eight?

(1) They may have been incorrectly diagnosed, and what was taken to be a pathological gallbladder may have been apparently normal on microscopic examination. Two of the gallbladders were probably of this type. This occurred in sixteen of Jacobson's series and six of his patients considered themselves worse than before the operation.

(2) Other abdominal pathology may have been overlooked during the exploration.

(3) The inflammatory process in the biliary tract which was treated may have been only a portion of the disease present.

Graham⁷, while working at Rush Medical College, brought out the constant relation between hepatitis and cholecystitis. He observed that there is usually a certain amount of hepatic enlargement in the cases of gallbladder

TABLE I.
CURED

Cholecystectomy

Cases	Major Symptoms	Associated Symptoms and Findings
30	Acute attacks of pain	19 no stone 11 had stone 6 had reflex symptoms
1	Had dull aching pain	had reflex symptoms
5	Gastric reflex symptoms	no history of attacks of pain 4 no stone 1 had stone

Cholecystotomy

3	Acute attacks of pain	3 had stone 1 had reflex symptoms
1	Reflex symptoms	1 had stone

disease and that it is due to two factors: (1) edema of the liver and (2) infiltration of the periportal spaces with lymphocytes. In the series he worked with, he did both a cholecystectomy and cholecystotomy with relief to the patient and, as clinical improvement took place, the liver diminished in size. Last year, he did some experimental work along the same lines and he found that cholecystitis and hepatitis are invariably associated with one another and that infection in one part is kept up in the other through the lymphatics. He concludes by saying that removal of the infection in the gallbladder, preferably by excision, caused the hepatic inflammatory process to clear up.

If these conclusions are correct, we may possibly have an answer as to why certain patients do not improve in their gastric symptoms; there may be a chronic hepatitis resembling an early cirrhosis which, as Osler⁸ says, may present vague gastric symptoms. Even though you did remove the gall bladder in these cases, the infective fire would continue to smoulder and produce the disorders complained of. There would then be a disturbance in the secre-

tion of bile and its constituents and a derangement of fat digestion resulting in intestinal stasis with imperfect digestion of fats, which is commonly looked upon as the cause of the gastric symptoms. This is merely a supposition and could only be checked up by a thorough investigation of the physiology of pathological livers.

TABLE III.

UNIMPROVED

Cholecystectomy

Cases	Major Symptoms	Associated Symptoms and Findings
1	Acute attacks of pain	cord tumor
6	Reflex symptoms	no stone

Cholecystotomy

2	Reflex symptoms	no stone
9		

TABLE II.

IMPROVED

Cholecystectomy

Cases	Major Symptoms	Associated Symptoms and Findings
2	Had acute attacks of pain	no stone no reflex symptoms
2	Dull pain under ribs	reflex symptoms no stone
8	Reflex symptoms only	no stone

Cholecystotomy

2	Acute attacks of pain	no stone 2 reflex symptoms
1	Dull pain	no stone 1 reflex symptoms
2	Had reflex symptoms	1 had stones (recurrence now) 2 no stone

In order to reduce the continued morbidity after operation in this group of cases where surgery is apt to fail, we have resorted to the method of Lyon, namely: duodenal biliary lavage. This same method has been tried out as a post-operative procedure in patients who continue to complain after a sufficient length of time has been allowed to pass in order to show that operation has not relieved them. Although the series is as yet too small to be of any great significance, many of them are greatly relieved of the pain and fullness under the right costal border and a few say that they belch less gas than formerly.

In conclusion, I wish to say that the prognosis of cases following operative interference on the gallbladder and biliary tract is dependent upon the group in which the patient falls. Those patients complaining of acute attacks of pain or a dull aching pain under the right costal border are practically always cured or benefitted and in case of recurrence of symptoms, they can be re-operated on with a good reassurance of recovery. However, the patients in whom symptoms are mainly gastric, one-third or more may return with the identical symptoms and in these patients who come back and tell us how bad they feel after opera-

tion, we cannot recommend any further surgical interference with any degree of success.

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DISCUSSION

DR. H. L. ULRICH, Minneapolis: I think we should all thank Dr. Meland for bringing this paper before us. It is not often a medical section is favored by a discussion which has such a decided surgical trend. The surgeon for some years has been teaching us new facts in pathology. Just as they have done it in diseases of the thyroid, they are doing it for us in the abdominal cavity. Dr. Meland's analysis touches on some interesting points in connection with gallbladder disease. The physiology of this area is so interlaced and related to the various contiguous organs, that it is astonishing that surgical interference can bring about as many excellent results as it does. The fact that a hepatitis or a pancreatitis or both is associated with cholecystitis is only one of the recent contribution of the surgeons. That a hepatitis or pancreatitis recedes after the removal of an infected gallbladder is a still more recent assumption. Dr. Meland has rightfully questioned the recession of some of these as brought out by his statistical study of end results.

From a broader point of view of gallbladder disease I asked Dr. Cook of the Northwestern Life Insurance Company about the longevity of these people who are operated for gall bladder disease. He says it is reduced about six years. What does this mean? It means that gall bladder infection is but a part of the larger problem of focal infection and that people having focal infection are less viable than persons free from such infections. Reduction of the gall bladder is in accord with reduction of foci in other parts of the body.

Another point brought out by Dr. Meland was the use of duodenal lavage in his post-operative unsuccessful cases. Just what that can do I do not know. Lyon's diagnostic and therapeutic measure is still a questionable procedure. This is particularly true

when we now know that the walls of the gallbladder are hardly developed enough to contract with enough force to expel the contents. It takes a strong intra abdominal pressure to push bile out of the gall bladder. Biliary flow is stimulated by eating. During fasting there is no flow. We used to think of the gall bladder as a sort of reservoir which squeezed out bile when it was needed. Rouse and McMaster at the Rockefeller Institute have recently pointed out that the gall bladder has a distinct function i. e. in the concentration of bile. The bile concentrated eleven times within twenty-four hours as measured by biliary pigment values. These experiments were determined in dogs. In the light of these facts why magnesium sulphate thrown directly into the duodenum should improve the symptoms of a cholecystectomised or a cholecystotomised individual is still problematic. I do wish however, that Dr. Meland will be given the opportunity to report to us the further study of this feature of his researches.

DR. CHARLES B. WRIGHT, Minneapolis: I was much interested in the Lyon method of estimating the function of the gall bladder. There is no question but that you can get the most remarkable results from the use of magnesium sulphate. If you inject this, instead of getting the usual yellowish opalescent liquid, you get within a few minutes a beautiful flow of dark bile. You can get the same result with ordinary tap water, and as Dr. Meland has said, you get probably the best stimulus during a meal. During a meal there is a flow of bile and during fasting there is no flow. The question as to whether it is of any therapeutic value to inject the magnesium sulphate is not yet decided. Krohn after careful study decided it was not. If we could perform lavage on the biliary tract it would be of great value. In the treatment of chronic gall bladder conditions, we are often at a loss. We can, by removing the gall bladder, remove the focus of infection, it is true, but if it is an old, contracted gall bladder the adhesions and the damage which has already been done will produce more or less pain, which will not be relieved by the operation. We can relieve the patients of the temperature, chills and infection, but we may not relieve them of a great deal of their discomfort.

DR. SÖREN P. REES, Minneapolis: Just a word about the group of cases in which the writer has not found much benefit from operation, the so-called peptic or gastric type of cases. I wonder if that isn't the group in which the gastric tests will help us to avoid an operation which may not help and which in certain cases may set up adhesions that will add to our trouble. I have had the good fortune to be "next door" to Dr. W. P. Larson, Professor of Bacteriology at the University. As soon as the bile was collected by the duodenal tube in sterile test tubes I could put it almost immediately into his hands. We have thus found that in some cases the staphylococcus albus has been present in pure culture. My experience

demonstrates that we can by careful technic secure the bile from the biliary tract by the duodenal tube and demonstrate a specific infection, and that is a great help in deciding what to do in the way of treatment.

DR. H. J. LLOYD, Mankato: I would like to add to what the last speaker has said of duodenal drainage for diagnostic purposes. At our Clinic we make it a practice to do duodenal drainage for diagnostic purposes before any operation on the gall bladder, and it is interesting to find that most of the cases which show the presence of an infection in the aspirated bile, show the same condition in the gall bladder on operation. A failure of properly interpreting the microscopic findings of the duodenal aspirate has been because the microscopic examination of the contents of the fasting stomach has not been taken into consideration. That should always be done first to eliminate any possibility of an infection being present in the upper respiratory passages and from there being carried through the stomach into the duodenal canal, thus interfering with the proper interpretation of the microscopic findings of the duodenal contents.

INTESTINAL POLYPOSIS AND ITS RELATION TO CARCINOMA*

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Intestinal polyposis is a comparatively rare disease, from both a clinical and a pathological point of view, receiving scant attention from the medical literature and still less from the text-books. It was first mentioned by Menzel¹ in 1721 but was then neglected until 1832 when Wagner² noted small polypi on the edges of healed ulcers. In 1839 Rakitansky³ made similar observations and interpreted them as small islands of mucous membrane caught by the cicatricial tissue in the healing of the ulcers. But it was not until 1861 that a comprehensive description of the polypi themselves was given by Lebert⁴. Since that time the most notable contributions to the subject have been given by Doering⁵ who collected fifty cases from the literature, and added two of his own in 1907; by Soper⁶ who reported one of his own and collected eight in 1916, and by Struthers⁷ who in 1920 presented thirty-nine cases from the Mayo Clinic.

During 1921 the necropsies performed at the

Miller Hospital yielded two cases of intestinal polypi associated with carcinoma, apparently, superimposed upon a single polypus. Both were in males in early middle life and both showed only symptoms referable to the development of the malignant growth and none referable to the polyposis which, in all probability, existed for some time before the fatal complication. One presented the rare finding of the polypi in the small intestine. Neither showed a general inflammatory condition of the mucosa.

Case I: Male, aged 36, gave a history of illness beginning nine months before admission to the hospital, with a dull ache in the abdomen coming at irregular intervals, frequently in the afternoon. This gradually increased in severity and frequency until it became a persistent pain with recurring acute attacks. At last it localized on the right side when a diagnosis of acute appendicitis was made and an operation attempted by his family physician. Instead of an affected appendix, however, a tumor was found in the hepatic flexure, the angle of which was unusually acute. Upon this discovery the wound was closed and the patient brought to Dr. Archibald MacLaren and Dr. H. P. Ritchie. He was admitted to the Miller Hospital on Feb. 25, 1921; the tumor was sutured to the abdominal wound and the bowel drained. On March 7, 1921, the mass was removed. It was about the size of a small orange and, extending into the lumen of the bowel, caused an almost complete obstruction. It consisted of firm white tissue, with an ulcerating mucosa on the surface covered by a foul-smelling purulent exudate. At the highest point of the tumor mass was an adenomatous polypus about 2 cm. in height with an irregular cauliflower-like surface. Gross section showed the base of this polypus to be continuous with the tumor. The microscopic section showed the regular, well differentiated epithelium of the glands of the polypus at one point suddenly changed to the irregular, poorly differentiated, embryonic, glandular epithelium of the adenocarcinoma comprising the new growth. The patient developed a general peritonitis and died on March 12, 1921.

The necropsy performed four hours after death disclosed six small polypi of various types and sizes distributed throughout the intestinal tract. Some were pedunculated with rough cauliflower-like surfaces. Others were sessile and covered by comparatively smooth mucosa. Four were in the small intestine and two in the large, exclusive of the one removed with the tumor. None of these showed any evidence of carcinomatous growth. The intestinal mucosa showed no evidence of inflammation at any point except upon the surface of the tumor and in the polypi themselves.

In all probability this tumor mass represented a

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carcinomatous process beginning in the base of a benign polyp. However, there must be granted the possibility of a carcinoma beginning in the intestinal wall near the polyp and carrying it up on its surface with no histological relationship between them, but such a point is an unusual one for the site of a primary carcinoma.

Case II. Male, aged 38, gave a history of a persistent diarrhea beginning in September 1920, and averaging four to five stools a day, occasionally as many as twelve. There began also about that time a progressive loss of weight and weakness which soon confined him to bed. About March 22, 1921, he had a profuse rectal hemorrhage and was admitted to the Miller Hospital under the care of Dr. E. T. F. Richards and Dr. E. T. Herrmann. He was found to have a secondary anemia, a white count of 11,000 with a normal differential count and a normal urine. A mass could be palpated in the right side of the abdomen but because of the persistent bleeding a rectal examination was not made. He grew rapidly worse and died March 31, 1921.

The necropsy which was performed two hours after death showed an enormously dilated colon, especially the cecum, which was probably the mass palpated. At the junction of the rectum and sigmoid was an annular, markedly indurated, ulcerating tumor causing almost complete obstruction of the bowel at that point. Both above and below, but especially above the tumor mass, were many small polypi almost entirely covering the intestinal wall. These presented smooth surfaces and were covered by intact mucosa. In the wall of the ascending colon, about half way between the cecum and hepatic flexure, was a broad sessile polyp about 4 cm. in diameter. This had a slightly lobulated surface, was soft in consistency, with no induration, inflammation or ulceration at any point, and was covered by smooth epithelium. Metastatic carcinomata were present in the liver, spleen, kidney, and abdominal lymph-nodes.

These polypi as in Case I showed in the center and among the glands many poly-morphonuclear-leucocytes similar to condylomata, thought to arise in response to irritating discharges.

Multiple polypi of the intestinal tract, though considered a rare disease, may often be overlooked, due to the paucity of clinical symptoms produced and the fact that only too often do pathologists neglect to carefully examine the entire lumen of the intestinal tract. Further, carefully performed necropsies and the correlation of the findings, with accurate clinical data, will do much to give this subject the status it deserves.

Intestinal polypi are usually multiple, may be either sessile or pedunculated, and may be mucous, adenomatous or papillomatous in type.

Several types may be present in the same individual, as in the two cases here reported. They are most common in the rectum, less common in the colon, and rare in the small intestine. They show a tendency to appear at the points of flexure in the colon. They are usually found in the earlier years of life, according to Doering and Struthers, (about 50 per cent before the age of 35 years) and are more common in males (2:1 Struthers). Some observers have found the condition to be a familiar characteristic. Many polypi become the site of a carcinomatous process, usually in one polyp only but occasionally in several. These carcinomata are much more frequent in the rectum. Although the etiology is as yet obscure, various theories concerning it have been advanced. The older observers suggested that polypi might be the result of islanded, hypertrophying mucosa caught in new forming cicatricial tissue in healing ulcers, but later writers have often found the process unaccompanied by any evidences of old or healing ulcers. Constipation has also been suggested as a cause since polypi are most common in the rectum where the hard fecal material might irritate the mucosa, but since polypi predominate in males, and constipation in females, and since constipation is such a common ailment unaccompanied by polypi, the suggestion has carried very little weight. Yet others suggest a general inflammation, as colitis or dysentery, as an etiological factor, an opinion sustained by Struthers from the Mayo Clinic, and borne out by these two cases with the inflammation present in the polypi. Meyer⁸ considered it due to a congenital defect of the intestinal wall with secondary epithelial reaction, a suggestion strengthened by their occurrence in early life and the familial tendency. However, it is hard to believe that congenital defects would be so frequently multiple, would give rise to epithelial reactions of such variable appearance and would predominate in the rectum and colon.

Another theory offered by Lebert⁹ is that of chronic irritation due to the constant bacterial and mechanical action of the feces. This theory is strengthened by the facts that the polypi predominate in the rectum where the formed feces would cause the maximum irritation, by

the frequent occurrence at the points of flexure where the mechanical action of the fecal contents is exaggerated, and by the comparative rarity of polypi in the small intestine with its fluid contents and minimal bacterial action. However in that case polyposis should be a more common condition.

The most common complication of intestinal polyposis is intussusception where the offending polyp is often seen and removed at operation, but only too often in such cases just one is removed while its equally harmful neighbor is overlooked, and the process may be repeated later.



Fig. 1. Simple Polyp.

But a yet more serious complication is that of a carcinomatous process superimposed upon one or more polypi, as found in the two cases reported here. Although it must be admitted that polypi, many of which are unrecognized, may escape such a sequence of events, yet the complication is comparatively common. Ewing¹⁰ states that 50 per cent of intestinal polypi show carcinoma; Doring finds it in 46 per cent; Soper in 43 per cent, and Struthers in 10 per cent. In many cases showing no evidence of malignancy at the time of observation a carcinoma might yet at some later date have developed so that even these percentages may very imperfectly represent the danger of this complication.

The cause of intestinal polyposis, whatever it may be, in all probability bears a direct relation to the carcinomatous change. It is easy to believe that an epithelial hyperplasia, whether primary

in response to irritation or secondary to congenital defects, may, when started, easily go on to malignant change. If we accept chronic irritation as a plausible cause it is a very logical deduction that the irritant constantly applied may easily stimulate the epithelial hyperplasia continuously until it breaks normal bounds and forms a malignant tumor. That one polyp alone is usually affected by the carcinomatous process may be due to the fact that it proves fatal before another becomes affected to any marked degree.

We have become accustomed to the fact that carcinoma frequently occur at any point which is undergoing a constant irritation. It seems also very logical that any polyp extending into the intestinal lumen constantly subjected to chemical, bacterial, and mechanical irritation of the fecal material, may become the site of a malignant process. This opinion is farther borne out by the fact that these carcinomata are often multiple, that they may occur in areas not usually the site of a primary carcinoma, and that, as a rule, they occur at an earlier age than the usual carcinomatous process. That polypi occurring in the cervix or nasal passages, even when presenting a similar structure to the intestinal polyp, very rarely become malignant, may be due to the fact that they are not subjected to the bacterial and mechanical irritation of the intestinal canal and do not become hyperplastic.

CONCLUSIONS

(1) Intestinal polyposis is a disease of real importance and is entitled to more detailed ob-

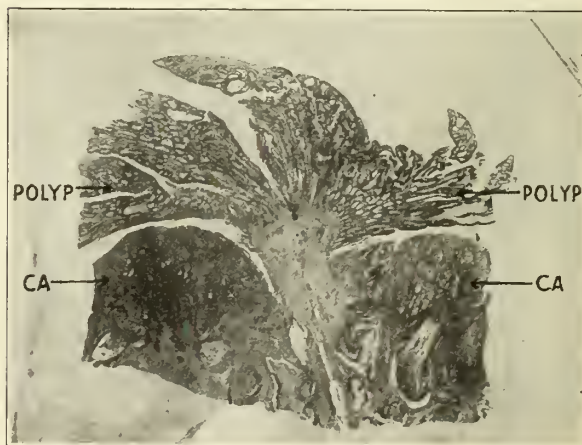


Fig. 2. Polyp superimposed upon a carcinoma.

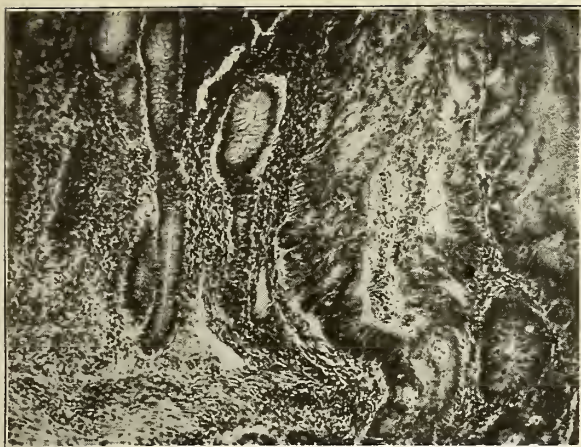


Fig. 3. High power picture at the juncture of the polyp and carcinoma.

servation and study. This can best be accomplished by careful, complete necropsies and correlation of the findings with clinical data.

(2) Carcinomatous change of one or more polypi is a very common complication. Two more of these cases are here added to the literature.

(3) Chronic mechanical and bacterial irritation of the fecal contents of the intestinal canal probably plays a very important role in the cause of intestinal polypi with frequent development into carcinomata.

(4) The polypi may be of various types and situated at any point in the intestinal tract, but they increase in frequency toward the rectum where they predominate.

(5) Intestinal polypi are usually multiple.

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DISCUSSION

DR. ARCHIBALD MACLAREN, St. Paul. I want to say that Dr. Warwick has been a great help to me in showing me how to get postmortem examinations more frequently. Dr. Warwick's success, in her University and Miller Hospital work, in obtaining the consent of the family of the deceased patient for postmortem examination, by her presentation of the good to be obtained has in so many instances overcome the natural aversion, and so much absolute information has been obtained, that I have come to believe that this one weak point in our work can be easily overcome and especially if a competent woman is in attendance. And also I feel that we have in the past let too many opportunities go by because of our failure to get the consent of the friends.

From the postmortem work done by Dr. Warwick for me a great deal of useful information has been obtained, we never speak of a postmortem examination or autopsy because it suggests, and is usually classed among the laity as belonging to murder trials and court work and all sorts of horrors; but we simply say that we wish to examine the body as an aid in helping other suffering people.

I think intestinal polyposis must be quite a rare disease. I have seen it only a few times. Many years ago, I operated upon a man, amputating his rectum, but if I had had a proctoscope and the various other aids, which we have to day, that operation would not have been done, because I only removed a part of his trouble. In this amputated rectum, were a few carcinomatous nodules; later, postmortem showed that they were scattered all through the large intestine.

This man, whom Dr. Warwick reports, died in a very peculiar way. He vomited very violently after his Mikulicz operation. I simply loosened the intestine, brought up a double loop, (the intestine was not opened) and there was almost no chance for this man to develop septic peritonitis in the ordinary way. The intestine was cut off on the fourth day, and the next day he developed symptoms of peritonitis. He had gotten a secondary infection through a tear around the intestine, due to the violent vomiting, leaving an opening, through which the infection from his opened bowel, reached the peritoneal cavity.

CIRCULATORY DISTURBANCES OF THE FEET*

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It falls to the lot of the orthopedic surgeon to see a great many cases of foot complaint. Thanks to widely advertised foot plates, "arch supports," as well as loudly heralded brands of shoes designed to cure, as by magic, all "foot ailments" nearly all cases of foot trouble arrive at the physicians office having tried one or more of these enre-alls.

It is a matter of fact that there exist a multiplicity of foot ailments which may attack previously normal feet and which are apart from the condition of weak foot (more commonly and erroneously known as "flat foot") for which these mechanical supports are designed. In this connection one need but mention as examples the arthritic conditions of the feet, the large list of infections of the bones and joints, the cases of bursitis and exostoses; and the results of trauma to the various structures of the feet.

A not very frequent cause of foot complaint is disturbance of the circulation of the feet. And this condition is never recognized by the shoe clerk and sometimes, forsooth, not even by the physician. The reason for the latter fact is that there exists little in the literature on this subject and what exists is often confusing. A considerable amount of terminology has arisen which often overlaps and sometimes only names certain phases of the diseases in question—witness the names: myasthenia angiosclerotica, intermittent claudication, thrombangitis obliterans, endarteritis obliterans, "spontan gangran," erythromelalgia and others. Some of these names are based on pathological anatomy; others on the symptomatology.

It seemed timely, therefore, not only to call attention to a group of often overlooked foot conditions but also to attempt to classify the various types of circulatory foot disturbance in as simple a manner as possible and as the facts seem to warrant.

As to the circulation of blood in the feet we must remember that the feet are far away from the heart; that, with the upright posture of man, there is a mechanical disadvantage and difficulty for the venous blood to get back to the general circulation. We will recall that in cases of freezing, the feet are more often more seriously affected than the hands though usually better covered; also that it is difficult to inject the arteries of the feet in a cadaver. Any interference with the circulation of the feet means interference with the oxygen and food supply to the structures of the feet. We must finally remember that human feet are much used organs. It is not surprising that they should register complaint in the form of ache and pain, if their air and food supply are interfered with.

This paper is a result of the study of 67 cases seen in private practice taken from 500 consecutive cases of "foot complaint." There were 34 men and 33 women; nearly all cases were of middle age or past. As to nationality they were American (38) Jewish (21), German (2), Scandinavian (4), Austrian (1), French (1).

Circulatory disturbances of the feet may be due to interference with the venous or arterial systems. In three cases there was evidence of a combination of the two.

Veins.—We need not spend much time discussing this phase; all cases consisted of varicose veins. There were 23 cases in this series. There was evidence of weak foot in 16, bunion in 3, metatarsalgia in 1. These cases came for treatment of pains in the feet and it was important to recognize the presence of the varicose veins and treat them.

Arteries.—In this series there were 42 cases; 29 male; 13 female; nearly all of these cases ranged between 45 and 65 although there was one case in a girl of 14. Nationality—Americans (27), Jewish (13), German (1), Scandinavian (1). It is well known that the Jewish race is peculiarly prone to this form of foot disorder. As will be noted however the majority of the cases occurred in Americans and this is probably due to the fact that there does not exist as large a proportion of Jewish population in the Northwest as in some other sec-

*Presented before the Minnesota State Medical Association, Duluth, Minn., August 1921.

tions of the Country. A considerable number of these cases were of the "nervous type."

Etiology: It is well nigh impossible to trace back the exact etiology in a given case. A certain number of these cases are no doubt congenital, the blood vessels being small, but the toxemias can probably be held responsible in a large majority of these cases. In our series they were divided as follows: tobacco (8), alcohol (1), excessive coffee drinking (4), syphilis (1), diabetes (1). A certain number of cases can, I believe, be ascribed to prolonged exposure to severe cold (7 of this series give a history of outdoor winter work). Three cases give a history of injury. In one of the most marked cases a gunshot wound had destroyed the popliteal artery causing the foot to be pulseless and the tissues of the foot to be of low vitality, painful and prone to infection.

Symptoms: The symptoms of these cases show that there is withheld from the tissues either the oxygen or the food supply or both. I have occasionally referred to this as "arterial hunger." These cases complain of pain which is variable. Nineteen complained of pain on moderate use; 7 on over use; 15 cases complained bitterly of pain at night (night pain seems to be quite characteristic of arterial disturbance). In 8 cases the feet were exquisitely tender; 10 complained of more or less constant swelling; 10 cases said that the wearing of braces increased the pain; (this, by the way, seems to be another fairly characteristic feature in most cases). There was a tendency to involvement of one foot only in 6 cases; 10 cases complained of cold feet and said it was difficult to keep the feet warm even in bed; 6 complained of numbness of the feet; in 10 there was present a distressing burning sensation; 2 complained that the feet "go to sleep" easily; in 2 cases there were cramps on very slight exertion.

Objective symptoms: On examination there was occasionally little to be found; the feet were often somewhat cyanotic; sometimes slightly edematous. The most important symptom is the absence of the dorsalis pedis pulse. In all of these cases no pulsation could be found in the dorsalis pedis artery and in the large majority of cases it was absent in both

feet; in more marked cases it was also impossible to detect any pulsation in the posterior tibial artery.

Complications: The following complications existed in the 42 reported cases of arterial foot trouble; gout (1), bunion (1), pes planus (10), ganglion (1), periostitis (1), metatarsalgia (3), neuritis (1), arthritis (4).

Classification: I know of no attempt at classification of these arterial lesions of the foot and believe that for this reason there exists so much confusion in the nomenclature. I wish to present the following classification for I believe that these cases can be placed in four groups:

- (a) Congenitally small arteries,
- (b) Arterial spasm,
- (c) Arteriosclerosis,
- (d) Thrombngitis obliterans.

(a) Congenitally Small Arteries: The subjoined case as well as two others similar and not necessary to report here makes me believe that at times the arteries of the foot are too small for their appointed task of conveying food and air supply to the feet; in no other way can I explain such cases.

Case Report: (Case No. 1100) V. H., aged 1 $\frac{1}{2}$, female, complains of right foot. F. H. and P. H. negative. Trouble began May 1913, onset gradual. No history of injury. Went to school until December, 1913. During the last few months used a cane. About a month ago, began using crutches. In July 1913, two months after the onset of this trouble, patient stepped on a thorn which entered the foot at the base of the second and third toes. Foot does not pain very much at night, although patient sleeps restlessly; however this is due more to general restlessness rather than to pain in the foot. Patient has fainting spells every two or three weeks. Other joint trouble denied excepting that patient says occasionally her hands get "white and cold" and, at such times, she can not use them; the hands stay this way for ten or fifteen minutes. This happens very frequently when patient gets chilly. Patient says she has occasionally noticed a red area (pointing to the region of the first metatarsal bone). Says that the foot is sometimes swollen a great deal more than it is today. Examination: There exists slight swelling over the internal surface of the right foot from the base of the first metatarsal to about the astragalo-navicular joint. The foot is slightly cyanotic, although the circulation is also rather impeded on the normal side. The foot is exquisitely tender. The foot is cold. The dorsalis pedis artery cannot be made out on the right side; on the left side it is barely perceptible.

(b) Arterial Spasm: (14 cases) These are perhaps the most interesting of the cases reported. The symptoms are, as mentioned above, those of local anemia. The condition is usually bilateral. The patient may be free from pain for considerable periods of time only to have it return either without cause or on exposure to moderate cold or after slight or moderate exercise; there may be burning pain; pain occurs in the various portions of the foot; pain in the calf musculature. The feet may cramp and "go to sleep" easily. The sensation of coldness in the feet is a frequent symptom. The pain is often increased by the use of a brace or arch support; the feet are often tender and during a painful "attack" there may be pallor and the patient may limp at times. On examination the feet may be normal; there may be pallor or slight cyanosis. On palpation it is impossible to detect the dorsalis pedis artery or any pulsation in it. In these cases we often get the history of overuse of tobacco or coffee; occasionally one can make a fair preliminary diagnosis before the patient removes his shoes simply by observing the following points: Semitic gentlemen of rather past middle age whose complaints are as outlined above and who carries in his hand a big black cigar; investigation will disclose that he smokes from 12 to 20 of these cigars per day.

Case Report: (Case No. 829) M. O. G., Jewish, male, aged 58, complains of both feet. F. H. and P. H. negative. For the past 3 years both feet, especially the left one, began bothering; pain in sole, in arch, up heelcord to calf of leg, varying. There never existed any tenderness about the feet; no pain at night. The chief trouble seems to consist in that after the patient has walked three or four blocks a certain amount of cramping takes place. During the past few months he says he has noticed a numb sensation at the ends of the toes, especially of the right foot. This also happens chiefly after moderate use of the feet. Patient has tried arches which have given considerable discomfort and therefore he has discontinued them. Has been wearing warm socks to bed for past few years. Says his feet get cold easily in bed. Examination: No atrophy of leg musculature; no sinking of either arch; slight callosities under the anterior arch of both feet. None of the arteries going to the foot can be felt. The ends of the toes are cold. No discoloration.

Case report: (Case No. 2954) H. B., Jewish male, aged 39. Complains of right foot. F. H. and P. H. negative. For the past 5 or 6 months pain in right foot of indefinite character; this pain comes in spells

and occasionally leaves absolutely for a week or two, when it returns, lasting a week or two; pain gradually getting worse; numbness about foot; during the past 4 or 5 weeks patient has noticed "white spots" (localized anemia); foot gets cold easily. Examination: The right foot is slightly colder than left foot otherwise no physical signs except that the dorsalis pedis pulse is absolutely absent.

(c) Arteriosclerosis of the feet: (23 cases). The arteries of the feet may be the earliest in the body to show pathological changes in the vessel walls. The symptoms are similar to those enumerated above but usually more persistent and sometimes more severe. On palpation the dorsalis pedis artery is found to be hard and usually pulseless. X-ray often shows calcareous deposits.

Case report: (Case No. 659) D. H. D., aged 47, male, American. Complains of right foot. F. H. and P. H. negative. Two years ago patient experienced some trouble with the right foot. Pain in arch, which remained for some weeks, caused patient to limp. This cleared up and remained O. K. until Nov. 1916, when patient had a second attack very similar, only worse. The pain this time extended up the leg and hip, right foot only affected. About ten or twelve days ago, right foot suddenly began paining in the arch of the foot (plantar surface). Foot gets cold easily. Toes are always colder on right foot than on left. Has much pain at night. Foot has not swelled. Has not been discolored, excepting when patient is standing or the foot is hanging down, at which time the foot becomes cyanotic. Examination: Dorsalis pedis artery absolutely absent; toes cold; feet cyanotic when pendant. Very tender under heel and anterior to the heel on the plantar surface of the foot. Motions of ankle normal. No swelling. Patient uses crutches.

(d) Thrombangitis obliterans: (2 cases) This disease is I believe, rarely seen in the Northwest as it most frequently affects the Jewish race. It is therefore frequently observed in parts of Europe as well as in New York. Franenthal of New York has observed many cases and described them. The best work on this subject has been done by Burger. There is a question whether or not this condition does not simply represent the final stage of some of the cases of arterial spasm and arteriosclerosis. The patients are in a pitiful condition and give a history of prolonged suffering usually in both feet, including many of the symptoms of "arterial hunger" as mentioned above. On examination there may be gangrene of the toes and even of the foot. The disease is usually progressive and amputation is often necessary.

Burger has shown that there exists cases of extreme thrombosis of the arteries of the foot extending sometimes well up the leg. The disease is "idiopathic."

Case Report: (Case No. 1159) D. R. K., male, aged 50, American. F. H. and P. H. negative. Patient began having trouble with feet about ten years ago; pain in forefoot of both feet; get cold easily; occasionally get numb; pain at night severe. About 4 years ago patient noticed that foot occasionally became discolored "blue"; 3 years ago patient stubbed his toe and a sore developed which did not heal, finally necessitating the amputating of toe on left foot; later another toe on left foot became diseased "by itself" and had to be amputated. Present complaint; for past 2 or 3 years patient complains of right foot acting similar to left and for the past 3 months an open sore has existed on the 3rd toe which refuses to heal. Examination: Well developed man; forefoot of both feet marked cyanotic; two toes missing on left foot. On the right foot there exists an ulcer on the dorsum of the middle toe which is deep and in fact involves the interphalangeal joint. Circulation of both feet involved; dorsalis pedis artery cannot be felt in either foot. Diagnosis: thrombangitis obliterans.

Case report: (Case No. 3410) D. G., Jewish, aged 34, male. Complains of both feet. F. H. and P. H. negative. Began some months ago evidently with a hammer toe of the second toes of the right foot. Corn developed on this which was operated on by somebody and he has had a running sore ever since. Has gone to several physicians who have failed to cure the foot. Both feet however have been giving patient considerable trouble for past six months or so. Pain in front part of both feet. Examination: There exists an ulcer on the dorsum of the second toe which goes down to the bone. The circulation of the right foot is absolutely impeded. The entire forefoot is blue and somewhat edematous. Dorsalis pedis artery as well as the posterior tibial cannot be made out. The left foot looks about the same as the right.

Treatment. The treatment seems about alike for these various arterial conditions. It is largely symptomatic but the careful attention to treatment often relieves the patient of most and, occasionally, of all pain. Of drugs sodium nitrite and potassium iodide may be tried. Alternate hot and cold foot baths often relieve and are of great value. Woolen stockings for day and night are to be recommended. Abstinence from coffee and tobacco is important. Heliotherapy is followed by good results in some cases. Rest to the feet is of course indicated.

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DISCUSSION

DR. J. R. KUTH, Duluth: I wish to compliment Dr. Geist, first, on the choice of subject, and second, on the very interesting and thorough manner in which he has presented it. Undoubtedly a great many of these cases are vascular in origin and have been proven so fairly definitely. It is, however, a question in my mind whether some of these cases may not be of neural origin rather than vascular. I have seen several cases of Raynaud's disease, and they resembled in many ways some of these cases. In general the spasms are more marked, the condition is less chronic, and many of them associated with other nervous disturbances. I believe that the cases of nerve origin may resemble some of these cases to a marked degree.

Some years ago I had occasion to examine a twelve year old girl who, five years previously, was hit in the lower back by a switch engine. She presented a marked deformity in the lumbo-sacral area. She complained persistently of low back trouble. She gave a history for a year or two previously of having recurring cramps in the great toe. During an examination she suddenly got up and grabbed the great toe, and it was found to be perfectly blanched and cramped. This was not a frequent manifestation, but I do believe it was definitely nervous in origin.

In the army one had a good opportunity of seeing many cases in which there was mild congestion with burning pain following definitely on nerve lesions, especially of the sciatic nerve, a condition of causalgia. They resembled a little bit these conditions. One must make up his mind whether or not some of these cases are not primarily of nerve origin rather than vascular.

DR. M. S. HENDERSON, Rochester: I also wish to compliment Dr. Geist on tackling another new field. Out of 500 cases, he shows that 12 per cent are due to circulatory foot disturbances, so that the subject is sufficiently important to warrant our considering it.

His classification of cases covers the field well. We see these cases in all stages. Some come to us complaining of indefinite pains in the foot and then we see them late in the disease when gangrene is present. So it is extremely important to take these people in hand and treat them early.

Dr. Geist did not mention focal infection and it is possible that a focal infection is a factor in a certain group. Occasionally we have a patient come in complaining of indefinite aches and pains but chiefly in the feet. We find nothing particularly wrong and it is not until we examine the urine and find sugar in it that we realize these patients are diabetics. There is not much to say about treatment except we have advised duodenal lavage and the injection of Ringer's solution and we really have accomplished very little. In the late cases where gangrene has taken place we have to amputate, and amputate high. Now I usually recommend amputation of the thigh where I formerly used to go below the knee.

CEREBROSPINAL ARTERIOSCLEROSIS*

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Those of us who are fortunate enough to escape death from the multitude of infectious diseases and other accidents to which man is heir, will ultimately succumb to a process of disintegration, of which arteriosclerosis of the nervous system is a frequent expression. A case exemplary of this disorder is as follows:

Mr. T. (Case 257266), aged fifty-two years, presented himself at the Clinic January 21, 1919, complaining principally of incontinence, which had been growing worse for two years. Coincident with this was a general failing of strength and the development of a tremor in the legs. One year before, he had begun to have dull, heavy headaches and a sensation of having his hat on. His friends noticed that his memory was failing. He left the harnessed horses to stand in the field all night, and forgot to take off their bridles when they were to eat; he expected to dine shortly after a meal was over, and gave his children's ages incorrectly. He became dizzy easily, often fell asleep during the day, and was confused in a crowd. At night he interpreted the rumbling of horses over a nearby bridge as thunder, and often became lost in his own house after he had been lying down.

The Wassermann reaction on the blood was negative. The renal functional tests were normal. The prostate was enlarged slightly; there were slight retinal arteriosclerosis and neurologic evidence of a subacute combined sclerosis of the spinal cord of arteriosclerotic origin.

Arteriosclerosis is not peculiar to old age; it may occur at the age of twenty years. Smith found that deaths occur from cerebral vascular disorders at an average age of sixty years, while apoplexy with hemorrhage and hypertension occurs about ten years earlier. The cause is said to be toxic. Josues first attempted to produce it experimentally by the administration of epinephrin and hydrastin. Saltakow believed he could produce it by the injection of

staphylococci. If these experiments are verified, arteriosclerosis may eventually be added to the list of disorders that result from focal infections.

The pathologic changes coincident with arteriosclerosis are generally understood. The difficulty in diagnosis lies in the correlation of such changes with the clinical expression of the disorder.

Figure 1 is a photograph of some of the larger blood vessels dissected from a brain. The basilar artery, the circle of Willis, the lenticulo-striate and lenticulo-optic arteries, the usual site of hemorrhage, are shown clearly. Unfortunately, the atheromatous areas are not so well shown; in the basilar artery, however, an enlargement that marks the site of almost complete obstruction of the vessel may be seen. The vessel walls are often greatly thickened (Figs. 2 and 3), particularly the intima, which may ulcerate and liberate emboli, thus causing paralytic strokes. The thickening may eventually completely obliterate the lumen of the vessel. The resorcin-fuchsin stain shows the splitting of the inner elastic membrane. Atrophy and regressive metamorphosis of senility may be seen instead of thickening; the wall of the vessel may become extremely thin and is then ruptured easily.

The lesion in the cord is a diffuse degeneration of the posterior and lateral columns constituting a type of combined sclerosis.

Increased intracellular deposit of pigment is common and has been looked on as a cause of death due to interference with cellular metabolism. A number of such cells may be seen in Figure 4. It would be more consistent to interpret this as a coincident expression of senescence rather than the cause of it.

One hundred forty-six cases of cerebrospinal arteriosclerosis examined in the Section on Neurology of the Mayo Clinic during the last year form the basis of my analysis. In 40 per cent of the cases there was objective evidence of spinal cord involvement. Inasmuch as these cases presented also all phases of the cerebral type of involvement, and since evidence of cord involvement strengthens the diagnosis, they were selected for detailed study. The average age of the patients was sixty-three years, the

*Presented before the Minnesota State Medical Association, Duluth, Minn., August 1921.

lower and upper extremes were fifty and seventy-eight years respectively. Males predominated (64 per cent). Vertigo was the most common complaint (57 per cent); it was very distressing in 11.8 per cent. Mental impairment was next in frequency. Headache was often present and very characteristic. It was often described as a sensation of pressure or weight and was bregmatic or frontal; sometimes it was intense, stabbing, and sharply localized. Patients often complained of trouble in walking; this was usually due to weakness, ataxia, or spasticity. Irritability is considered a common symptom; however in this series many of the marital partners stated that the patients were decidedly less irritable than they had been during health. Tinnitus is common and furnishes corroborative evidence of widespread involvement.

The epilepsy of arteriosclerosis differs in no essential respect from idiopathic epilepsy. Often the attacks are attributed to being "overcome by the heat," although the day may have been relatively cool. One man came because of repeated "sun-strokes." Strokes of various kinds, such as hemianopic, hemiplegic, and aphasic, are severe and incapacitating complications; ordinarily, however, too much importance is attached to them as requisites in making

a diagnosis of cerebral arteriosclerosis. They occurred in only 3 per cent of my series.

The diagnosis of cerebral arteriosclerosis does not represent merely an impression based on the history and the general behavior and appearance of the patient. Some help is gained from a careful examination. Pupillary irregularity and poor reactions to light and accommodation may often be noted. Since in-

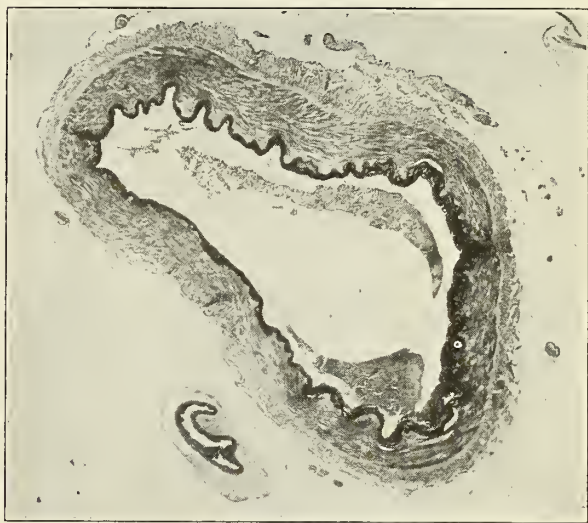


Fig. 2. An arteriosclerotic blood vessel stained with Weigert's elastic stain. Splitting of the inner elastic membrane is shown.

spection of pupils has become such an important procedure in the detection of syphilis, the interpretation of pupillary anomalies in senile persons must be made with extreme caution. An examination of the fundus must never be neglected, since retinal arteriosclerosis always means an associated cerebral arteriosclerosis; the reverse, however, is not necessarily true. Hearing, tested with the watch, is often found to be impaired. Patients hear a watch either not at all or at but a few centimeters from the ear. Touch, pain, temperature, and vibratory and joint sensibility may be impaired over the lower portion of the body. The patellar reflexes may be absent or unequal; usually the Achilles reflexes are either absent or unequal. The abdominal reflexes were absent in 66 per cent of this series. A positive Babinski reflex after one year of age is practically always indicative of an organic lesion of the central nervous system. A finding of the greatest import-



Fig. 1. Some of the larger blood vessels dissected from a brain showing marked arteriosclerotic changes. The circle of Willis is shown in the center.

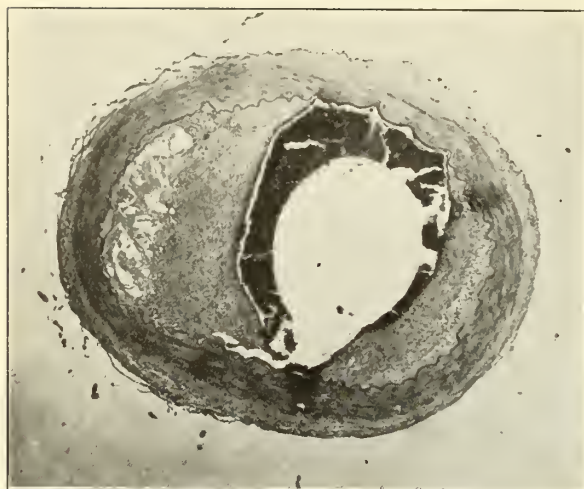


Fig. 3. Weigert's elastic stain. Cross section of an anterior cerebral artery showing marked intimal thickening.

ance, which is manifested in a very striking manner, is poorly sustained attention; this was noted in 62 per cent of patients of the series. The patient must be reminded again and again of the fact that he is being examined and that the point of a pin differs in certain respects from the head. Testing vibratory sensation, which requires full cooperation and fine discrimination, often must be abandoned. The resemblance of symptoms of arteriosclerosis of the nervous system to symptoms of frontal lobe tumors, particularly in the absence of choked

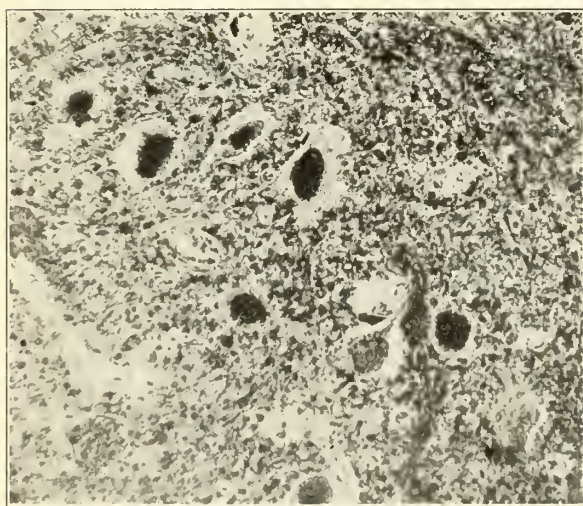


Fig. 4. Ganglion cells from the spinal cord in a case of arteriosclerosis, stained with Sudan III and methylene blue. Intracellular deposit of pigment is well shown. One of the ganglion cells near the center of the field is almost normal.

disks, is sometimes so striking that differentiation may be quite impossible.

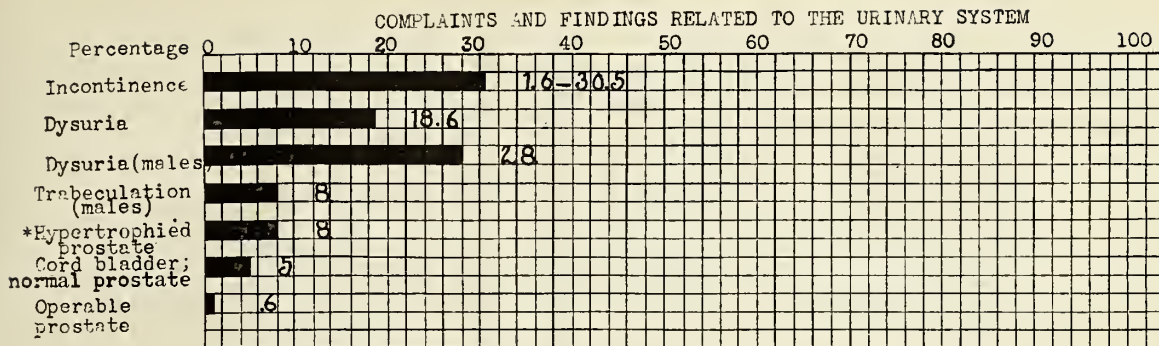
Unlike hemorrhage into the brain, hemorrhage into the cord, or hematomyelia, is rare. It does occur, however, and may cause a clinical picture as follows:

Mrs. A. K. (Case 154978), aged fifty-one years, who had suffered for some time from an extreme hypertension, suddenly developed complete paraplegia. Hot bottles were placed around her lower extremities, and she was very seriously burned and blistered by them before it was discovered that her lower extremities were without sensation. The sphincters were incontinent. The level of the anesthesia reached approximately to the level of the umbilicus. Several secondary infections and bedsores developed and the patient died.

Occasionally the peripheral nerves take part in the process, not nearly so frequently, however, as in pernicious anemia, a fact well demonstrated by Hamilton and Nixon.

Complaints relating to the urinary system are common (Fig. 5). In this series cystoscopic examinations were made when indicated, and trabeculated bladders were found in 8 per cent of the patients. Rectal examinations were made of all, and hypertrophied prostate was found in 8 per cent. Only one patient, however, had an enlargement sufficient to account for the symptoms and the trabeculation of the bladder. Operation in this case was followed by relief of symptoms. Obviously in these cases there is a fine balance between the cord as the cause of the trouble on the one hand, and the prostate as the cause on the other; both must be taken into consideration, otherwise surgery may be followed by far more distressing symptoms than those for which the patients primarily seek relief.

The relation between high blood pressure and cerebrospinal arteriosclerosis does not appear to be generally understood. The systolic and diastolic blood pressure curves shown in Figure 6 were constructed on differences in pressure of 10 points. Objection is often raised to the diagnosis of cerebral arteriosclerosis on the ground that the blood pressure is normal. The fact remains that 64.4 per cent of patients have a mean pressure of 130 mm. systolic and 78 mm.



*Enlargement was not sufficient to account for the symptoms except in one case of benign hypertrophy; operation was followed by improvement.

Fig. 5. Incidents of complaints and findings relating to the urinary apparatus in cases of cerebrospinal arteriosclerosis.

diastolic. Doubtless the lack of elasticity of vessels is responsible to a large degree for the low pressures. The same relationship is said to exist in peripheral and in cardiac arteriosclerosis.

In closing, a word might be said with regard to the prognosis. It seems to be the prevailing conception that arteriosclerosis of the nervous system is a terminal condition, and if a patient has been given this diagnosis, nothing but death is left for him; and that if he has had one

stroke, he has only to await another. It is true that the condition may terminate in this manner, but the patient must not be placed in fear of expecting every day to be his last. Marked improvement may result if habits of living are corrected, as by a daily noon-day nap, and interest in life reawakened.

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DISCUSSION

DR. E. M. HAMMES, St. Paul: In listening to Dr. Woltman's paper, three points impressed me: first, the age incidence; second, the absence of hypertension in a large percentage of his cases; and third, many of these cases have arteriosclerosis primarily in the central nervous system without any demonstrable clinical evidence in the general arterial system.

I am sorry Dr. Woltman did not lay more stress on the age incidence. Cerebro-spinal arteriosclerosis does occur in very young individuals. Schlosser reported a case with post-mortem findings at the age of fifteen. We had a patient of nineteen, under observation, who was a regular neurological museum. He was referred to us by Dr. Strobel of Welcome, Minn., because of a marked post-diphtheritic neuritis. Along with this he had a cerebellar tumor. Post-mortem revealed a tumor in the right cerebellar lobe, with most marked arteriosclerosis of the cerebral blood vessels, especially the circle of Willis.

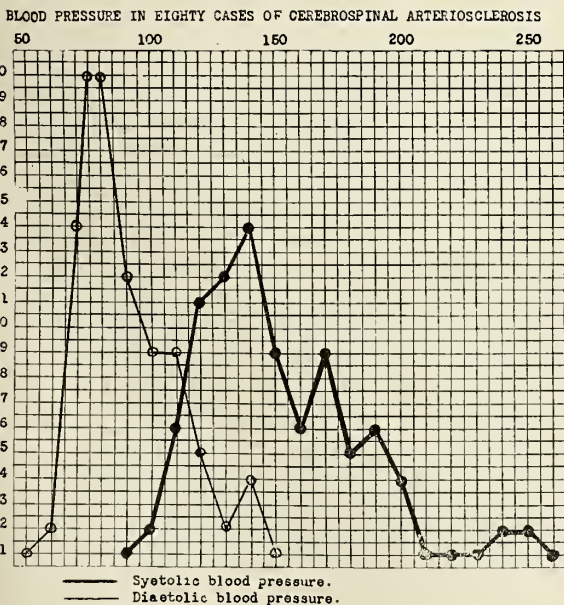


Fig. 6. Diastolic (light line) and systolic (heavy line) blood pressures in patients having cerebrospinal arteriosclerosis. The number of patients is shown on the left, the blood pressure is indicated above. Practically normal blood pressures are shown in patients with arteriosclerosis of the nervous system.

Regarding hypertension, many of these patients have a normal or even subnormal blood pressure.

Occasionally, one sees a young individual presenting the picture of a cerebral thrombus, embolus or hemorrhage. In the absence of any positive findings, such an endocarditis, postoperative conditions, syphilis, renal disease, etc., one must always bear in mind the possibility of an early cerebral arteriosclerosis. We usually associate cerebral arteriosclerosis with hypertension. However, cerebral hemorrhage can occur in primary cerebral arteriosclerosis with a normal or even subnormal blood pressure.

Dr. Woltman spoke of the difficulty of differentiating the pupillary reflex changes in these cases from the Argyll-Robertson pupil. I would like to ask Dr. Woltman if he refers to the senile pupil or if such pupillary changes also occur in the young adult with cerebral arteriosclerosis?

DR. E. L. TUOHY, Duluth: This subject deserves very careful attention, and Dr. Woltman is to be congratulated on making it so clear. The contention that you may have cerebral arteriosclerosis without changes elsewhere in the body is unquestionably correct. On the other hand, studying the patient from the broader point of view of the internist, I have been impressed again and again with the importance of linking up symptoms constitutionally with changes that might be attributed to cerebral vascular changes. There is also the need of a more common terminology, and of the necessity of restricting the use of certain terms. To Allbutt is due a great deal for making reasonably apparent what is meant by senile changes. It is probably true that an individual may be senile at the age of fifteen or twenty, but there is a great difference between the condition termed "atherosclerosis" (Allbutt) and those changes accompanying hypertension. Granted that this is true, rather than loosely judging some conditions and saying it is due to arteriosclerosis, we should restrict ourselves definitely to what we can show objectively. Dr. Woltman's chart showing the pupillary variations with the condition of the retina and the changes that he can demonstrate in the retina is very interesting, but we should go further. We have made studies of the legs with x-ray plates so as to show the changes in the tibial artery, and we should mark well the general muscular tone and nutrition.

In connection with extra nourishment and rest in the middle of the day, and the other measures he speaks of, if assiduously carried out, patients will often regain their weight and their muscular tone.

I have seen a definite correlation between true angina cases and those showing vascular cerebral changes (tinnitus aurium, vertigo, etc.).

We would profit greatly if a greater insistence upon a definition of terms were made and a common terminology adopted. Dr. Hammes is wrong in stating that a person will not have cerebral hemorrhage in the absence of hypertension. This, I am sure, has occurred repeatedly in individuals with

normal tension, tension that has been normal for many years, but in whom there is an inherent weakness in the blood vessel itself. Much confusion has arisen from the erroneous statement that arteriosclerosis means increased tension. Superimposition of different processes causes confusion. Primary kidney disease or chronic nephritis will be followed by hypertension. So called essential hypertension and "kombination form" nephritis are relatively frequent, but primarily the process discussed by Dr. Woltman concerns intimal atheroma, and has nothing to do with hypertension.

I would like to ask Dr. Woltman about the symptom of tremor as associated with cerebral vascular changes; he did not include it in his table.

DR. MOSES BARRON, Minneapolis: I was intensely interested in the paper and its discussions.

I recall the case of a young girl, thirteen years old, who died of cerebral hemorrhage, on whom I performed the autopsy. The examination revealed advanced atherosclerosis of the arteries, which was especially marked in the cerebral vessels. Some of the branches were almost completely closed. The blood clot in the brain was as large as the child's fist. The child had shown some mental disturbances previously, having been depressed a great deal, and having sat around moping a great portion of the time. Unfortunately the doctor in charge had not taken the blood pressure, since the condition had not, at all, been suspected. Death occurred very suddenly. Cases of severe atherosclerosis in children, especially of the cerebral vessels, are not so infrequent in the literature as one would suppose.

The relation of hemorrhage to hypertension has well been brought out in the discussion. I do not believe, however, that it is necessary to have high blood pressure in order that a cerebral hemorrhage may obtain. I believe that hemorrhage can occur whenever there is a disproportion between the tensile strength of the blood vessels and the blood pressure inside. Cerebral hemorrhage does occur in cases in which the blood pressure lies within the normal limits, provided the cerebral vessels are sufficiently weakened through disease. In such a case, the rupture of the vessel-wall occurs exactly in the same manner as in cases of marked hypertension, with only moderately diseased vessel-walls.

DR. HENRY W. WOLTMAN, Rochester (Closing): I cannot say whether or not the "senile pupil" is seen in young persons. It was not present in the few I have seen of arteriosclerosis in young persons. Differentiating the senile pupil from the syphilitic pupil seems to be difficult only in older persons.

I am glad Dr. Tuohy pointed out the necessity of differentiating so-called essential hypertension from arteriosclerosis. That the two conditions are quite distinct, is apparent from the neurologic side alone. It did not occur to me that Dr. Hammes thought that hypertension is necessary before cerebral hem-

orrhage occurs, and he tells me this is not what he meant to say.

The tremor is more a shaking than a tremor. It is fairly rhythmical and very often involves the head as well as the hands. It is quite different from the tremor seen in multiple sclerosis or paralysis agitans.

HYSTERICAL DYSPHAGIA*

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Many references are found in medical literature to various hysterical manifestations, but I have been unable to find a description and discussion of a group of cases in which a hysterical inability to swallow is the predominating and sometimes the only symptom. From the records of the Mayo Clinic I have been able to collect sixty-nine such cases. Fifty-seven of the patients were females, and twelve were males. Patients having the ordinary "globus hystericus" are not included in the series, since they rarely, if ever, have any definite obstruction to food and none of them shows the marked nutritional disturbances seen in many of the patients selected for study.

The dysphagia usually began suddenly and in many instances the patients dated the onset of their symptoms from a time when they choked on a piece of solid food, the point of obstruction being high in the throat. This was followed by an inability to swallow solid food, particularly meat and green vegetables, and difficulty in swallowing pills or capsules. Liquids and soft foods were usually taken well, and the loss of body weight was not marked. A moderate or marked secondary anemia developed, probably due to the quality of the food taken.

Thirty-seven of the patients had a hemoglobin of 60 per cent or under; the lowest was 27 per cent. Enlargement of the spleen, usually quite marked, was noted in twelve cases. The duration of symptoms varied from one month to twenty-five years. Anemia was more liable to be present in cases in which the history of dysphagia was long standing. Roentgenographic examinations were made in all the

cases with negative results; and esophagoscopy examinations that were made revealed no lesions.

TREATMENT

The treatment consisted in passing a plain esophageal sound, the size immaterial, into the stomach, guided by a previously swallowed silk thread. The treatment was purely suggestive as there was no real stretching of the esophagus. The patients were encouraged to eat solid foods, and were given Bland's pills and Fowler's solution. Usually nothing further was necessary to bring about an immediate temporary cure. The blood picture improved at once, and if symptoms did not eventually recur it became normal. The spleen returned to normal size.

Prolonged observation of many of these patients demonstrated gratifying results. Recurrences, which may occur unless the patients are constantly reassured with regard to their condition, are usually in patients who have other hysterical manifestations. In case of recurrence a second passage of the sound will relieve for an indefinite period of time.

Hysterical dysphagia must be distinguished from all lesions producing dysphagia, but the lesion of fairly frequent occurrence with which it might easily be confused is a slow growing carcinoma at the introitus. The long duration of symptoms with absence of obstruction to the sound is usually enough to determine the diagnosis. In case of doubt, an esophagoscopy examination can be made without trouble.

An interesting feature in these cases is that after the dysphagia is relieved and food is being taken freely a moderate degree of hypothyroidism may develop, necessitating the regular administration of thyroxin. Plummer, who first pointed out this complex of dysphagia, without organic obstruction, anemia, and enlargement of the spleen, suggests that during the long period of inanition a light demand for thyroxin results in a disuse atrophy of the thyroid and hence following the relief of the dysphagia, the thyroid may not be able to meet the demand of the body.

CONCLUSIONS

1. Although hysterical dysphagia is a functional disorder, the prolonged unbalanced diet

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gives rise to enlargement of the spleen and secondary anemia.

2. Normal deglutition can be restored by passing an esophageal sound.

3. Recurrences are liable to occur, but can be relieved by further passage of sounds and by constantly reassuring the patient.

4. When normal deglutition is restored, the blood picture returns to normal, and the splenic enlargement subsides.

5. Hypothyroidism may develop after the patient begins to swallow freely, due to the inability of the thyroid to furnish secretion enough to care for the increased food intake.

DISCUSSION

DR. R. RIZER, Minneapolis: This is a very unusual picture. Outside of the Rochester Clinic, there are no other people in medicine today who have found the syndrome. Dr. Plummer was the first to recognize this condition, and Dr. Vinson has carried on the work. As Dr. Vinson has said, the time of the appearance of symptoms and the pathology have not been found to be correlated. One lady with a hemoglobin of thirty per cent was dilated, and improved a great deal. The dysphagia disappeared, and the spleen, which had been enlarged, could not be palpated. The lack of food had so changed her metabolic rate that her condition suggested hypothyroidism. She was put on thyroxin, thereby bringing her metabolic rate to normal.

One of the necessary things still to be done is the correlation of the symptoms and pathological findings. It appears to be a functional disturbance in that the patient can swallow liquids somewhat better than solids. The point that Dr. Vinson brought out concerning carcinoma should be considered first. The reason for the splenic enlargement is unknown, and there has not been found any change suggesting pellagra.

I think it is a very interesting condition and because of the fact that no other clinic has recognized a similar condition, it seems only fair that Dr. Vinson's name should be given to this disease.

DR. S. H. BOYER, Duluth: I have just one word to say if I may be permitted to do so. I do not believe this should be called Vinson's disease, with all due respect to the Doctor. There should be some other way of distinguishing the Doctor who discovered the condition. The multiplicity of personal names for disease is wrong. Let us not add to this but let us distinguish the Doctor in some other manner. (Applause)

PRINCIPLES GOVERNING THE TREATMENT OF FRACTURES*

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The purpose of this paper is to discuss a few of the principles which enter into the treatment of fractures. It is a well known fact that a large percentage of the most vicious malpractice suits are based on the treatment of fractures and, as long as there is such a wide diversity of opinion as to what is the proper treatment, it behooves us to consider this subject seriously.

The surgeon who can treat a fracture with prompt, careful and painstaking attention, realizing that the first 24 to 48 hours is as important as the early management of a maternity case, will find that his patient is better satisfied and the convalescence is offtime thus made easy. Too many times not enough attention is paid to this one point and additional trauma is added to the already torn tissues and broken bones, because the surgeon is not present to direct the treatment; or, sufficient instructions have not been given to the ambulance attendant, the nurse, or the interne at the hospital. The Thomas splint and the war has helped us greatly, but there is still room for improvement. The portable roentgen ray is the real big thing which has been introduced lately. The roentgen ray room in the hospital is of diagnostic value only in the treatment of fractures. The patient should not be carted about the hospital. After he is once in bed he should not be disturbed except for dressings.

In the treatment of fractures there are three results which we aim to make 100 per cent perfect: (1) Union. (2) Good Function. (3) Restoration of Normal Anatomy.

I. Union: The subject of *union* and *non-union* is still unsettled. Interposition of soft tissues and disease are clearly factors that produce non-union. But, with neither of these, there is still a small percentage of cases which baffles the most scientific investigation. There is a factor, however, which I think interferes with

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union, at least, to the extent of delayed union and that is absolute and perfect immobility.

In my early practice I was called to see an old lady, past 80 years of age, who ten days previously had sustained a fracture of the femur at the junction of the middle and upper third. As she was a religious fanatic, I was called for diagnosis only. With the aid of her frail daughter, she was daily assisted from the sanitary couch, on which she lay, into an old fashioned armed rocker, and back to the couch again in the evening. In spite of this treatment she obtained firm union with the leg four inches short and the foot everted to a right angle. She died three years later, of pneumonia. This case would lead us to believe that mobility did not interfere with union.

In February, 1921, Mr. A. F., farmer, aged 26, was admitted to the hospital with a transverse fracture of the femur in the middle third. I was able to get the fracture end-to-end but not perfectly reduced. He had no shortening and was perfectly comfortable with light weight extension and a Hodgen splint. After eight or ten weeks, instead of union becoming firm, as one should expect, the thigh could be very easily angulated at the point of fracture. I applied splints and, later, a plaster cast and got him up and about; in six or eight weeks he had very firm union. In this case I am inclined to think the perfect immobility at the beginning might have been a factor in the delayed union.

I feel confident from my experience, despite the fact that some very good men disagree, that a certain amount of mobility in the treatment of fractures is an aid rather than a hindrance to union.

II. Function: This should be the ultimate aim in the treatment of fractures. The surgeon's most important work is to treat the case in such a manner as will put the patient back to work, with the full use of the injured member, in the shortest possible time. Many factors have to do with good function but I only wish to speak of two: (a) Alignment without shortening, (b) Mobility of the joints.

(a) *Alignment:* It is very important that the joint surfaces should maintain the same relationship to the long axis of the bones as exists

normally. Probably this can best be illustrated in fractures of the tibia. The bearing surface of the lower end of the tibia should not be tilted in such a way as to get either an eversion or an inversion of the foot. This error invariably will give a painful joint. In the matter of importance, the alignment is vastly more important than a mild degree of shortening. I do not pretend to say that alignment without shortening is always possible, but I do say the surgeon should never be satisfied until he had made this one point as nearly 100 per cent perfect as it is humanly possible.

I think Bardenhauer was one of the first to recognize the importance of thoroughly understanding the mechanics of the bones and muscles. Following out the principles laid down by him, such men as Dr. W. W. Richardson, of Los Angeles, and Dr. Joseph Blake, of New York City, with the aid of the Balkan frame and various kinds of splints, extension, and counter-extension, etc., have done some very creditable work.

My observation has been that the surgeon often fails to properly analyze the mechanics and, consequently, fails in his results. In fractures of the femur, the most common error is failure to overcome the muscle spasm. These cases require energetic and active treatment. Usually weights heavier than the text books advocate are necessary to reduce the fracture. After 40 to 60 pounds have been applied for 12 to 24 hours, in most cases the fracture can, with the aid of an anesthetic and plenty of help, be reduced or, at least, the muscle spasm overcome so there is no shortening.

In all these cases the adhesive plaster should extend from the groin on the inside and from the trochanter on the outside, and it should be reinforced with diagonal strips to take in the whole leg avoiding the malleoli and possibly the knee. So far, the treatment is easy, but from now on the judgment of the surgeon must play a very important role. The patients will not stand the heavy weights for any considerable length of time. To carefully follow up the treatment and reduce the weights in such a way as to maintain a perfect reduction without untoward symptoms requires very close attention. Some of the weight will probably have

to be removed in 24 or 48 hours and, by the end of two or three weeks the weights may be reduced to ten or twenty pounds.

Dr. Kellogg Speed of Chicago, in his paper on "The Fracture of the Femur in Children," which he presented in Minneapolis last spring, showed very conclusively what can be done with weights when carefully adjusted to suit the case.

I have at the hospital at the present time, a boy eight years old, weighing about sixty pounds. I used on him eighteen pounds to start with, which would be equivalent to about fifty pounds for a man 160 or 175 pounds in weight. I have been able to maintain the leg without shortening and was able to let the weights down to five to nine pounds in two or three weeks.

Times does not permit me to take up the various fractures but the same principle of extension is applied to all.

(b) *Mobilization* of the joints is the second factor in obtaining good function. The old idea that fracture into the joints or near the joints should be immobilized to avoid callus formation and limitation of motion seems to me to be absolutely erroneous.

The results of immobilization probably are no better illustrated than by a double Colles fracture that came under my observation a short time ago. This was a railroad man, about sixty years of age, who, in going through the yard stumbled and fell, breaking both wrists. He was treated by a doctor up country, who was very conscientious, and to be sure that he should be well taken care of, he put up the fractures on straight splints for about six weeks, without mobilization. I saw the man about eight or ten weeks after the injury, with both hands and wrists absolutely crippled so that he was unable to eat or dress himself, and suffering very great pain. Had the patient been treated by mobilization, he would at least have had very good function at the time that I saw him.

According to Dr. Joseph Blake, whose opportunity during the war to study the methods and the effect of mobilization was very great, these cases should be mobilized from the very beginning. At least once a day and, preferably,

twice a day, the dressing should be removed and the joint manipulated to the limits of comfort. When a Colles fracture has been perfectly reduced and the patient is comfortable, it is a great temptation to let the mobilization go, to be taken up at some later date. However, I have been very much surprised to find, on removing the dressings, that about 50 per cent of flexion and extension can be obtained in these cases without a particle of pain. And, by persistently following them up until the patients can safely treat themselves, it is remarkable how soon we are able to get full use of the arm.

I think it was Dr. Cotton, of Boston, who has made the remark that, before the days of the roentgen ray when many of the wrist injuries which were undoubtedly fractures were treated as sprains, the disability was much shorter than at present. Rather a sad commentary on our up-to-date methods.

I had two cases which show the different results obtained by mobilization and immobilization with identical fractures of the upper end of the tibia. In both these cases there was a fracture into the joint. They were both railroadmen. In both cases we decided operative treatment not necessary. One was treated some time ago by immobilization of the joint, with plaster splints, for four or five weeks. He was in the hospital from August to March and left the hospital with considerable limitation of motion. The other was treated by keeping the proper alignment and daily mobilizing the point to the limit of comfort. At the end of eight weeks he had greater motion and a better result than the other man had at the end of seven months.

I wish to emphasize that this treatment should be done without pain. Any spasm of the muscle will cause pain and the fragments of the fracture are likely to be misplaced.

III. Restoration of normal anatomy: Since the advent of the roentgen ray many surgeons have placed too much importance on the restoration of normal bony anatomy at the expense of other tissues. There has been a great wave of operative treatment for fractures, a large percentage of which is absolutely unnecessary to obtain good function. Those of us who are constantly operating feel that the technique is

sufficiently standardized at present to make the work safe and a certain percentage must necessarily be operated, but the vast majority can be better treated by the bloodless method, with quicker recovery and consequent saving of time for the patient

IN CONCLUSION

1. The surgeon must realize that each case is a problem in itself and to get the best results he must have at hand the proper splints, frames, pulleys, etc., as well as the portable roentgen ray.

2. Union is best obtained in the presence of a certain amount of mobility.

3. Alignment is only obtained by studying the mechanics and properly applying extension, counter-extension, etc.

4. Complete reduction can only be obtained by sufficient weight properly applied.

5. Mobility of the joints can be obtained from the beginning, without pain, if the fracture is handled with gentleness and light massage.

6. The treatment which shortens disability and restores function at the earliest possible date is a great economic saving, both to the patient and to society at large.

DISCUSSION

DR. J. FRANK CORBETT, Minneapolis: I thoroughly appreciate the value of the paper that has just been read, and I will tell you why I appreciate it. I have been more or less closely connected with Dr. Green for some time. I have seen the results of his treatment of fractures in and near joints, and his results have been most gratifying. I think this is because of three cardinal principles that he has observed. The first of these is mobility. Now, with reference to mobility, we should not keep a fracture perfectly still. If one studies the repair of bone the answer is perfectly clear. The repair of bone is dependent upon the blood supply inside of that bone. MacEwen has shown the nutrient arteries of a bone without repair are greatly interfered with and will not grow at all. For that reason, if we put on a Lane plate, we interfere with the blood supply. If we completely immobilize the bone, we interfere with the primary hyperemia that is necessary for endosteal repair to occur. At least, it is evident that repair occurs more rapidly where we have encouraged the blood supply by movement than when it does not so occur.

What are the other reasons for this immobilization? It is difficult to apply any set of principles to all fractures, but these will hold good. Let us

suppose we have more or less injury to the muscles with any kind of fractures, and this will vary from a slight injury of a simple fracture to an extreme injury of the muscles with a compound fracture. I have seen perfect anatomical restoration of a bone with a perfectly useless limb because the muscles were bound to the bone in such a position that they could not act.

As to the prevention of joint adhesions, Dr. Green has convinced me against my will that mobility does prevent joint adhesions. I cannot explain this paradox. It does not seem reasonable, but I believe it is true, judging from the cases I have seen and handled where there were fractures into the joint as he says, they have gotten almost a perfect result in spite of the fact that he had early immobilized them.

The next important principle is the treatment of a muscle. When we have a fracture the muscle is thrown into a spasm, and a little injudicious, ineffective handling of that bone intensifies the spasm and increases it so that you can do nothing absolutely with it. I have seen a fracture where an attempt in unskilled hands and inefficient methods have been used at reduction that would get the limb in such a condition that one could do absolutely nothing with it. If you are going to overcome the muscle pull with brute force, you must use brute force; that is, if you by traction are going to overcome the contraction of the muscle a half way measure will not do. You have to use weight enough to do this, and it is perfectly surprising what simple traction will do in the reduction of fractures. Your hands cannot do that. It has to be done by some mechanical appliance in most cases, and that means sufficient weight.

DR. M. S. HENDERSON, Rochester: I agree with practically all that Dr. Green has said. However, I am not so sure that the early mobility of fractures is a good thing. There is a certain amount of mobility in any fracture no matter how thorough your attempt at immobilization. Even with a plaster of Paris cast properly applied, there is a certain amount of shrinkage under the cast and soon a certain amount of motion is permitted. I think there is a good deal of danger in the advocacy of such a method of early mobility. If the instructions and methods of Dr. Green are followed closely no harm will result but unfortunately many times such instructions are not always followed closely and bad results ensue. Our aim in the treatment of fractures is to reduce the deformity and secure anatomical alignment. If one feels he can do it best by conservative measures, that is all right, but some of us can do it better by open operations in certain types of fractures. For instance in the shaft of the femur and the shaft of the other long bones, I believe the open operation is in the majority of cases indicated. One would not think of advising an open operation on a Colles' or a Pott's fracture at least until con-

servative means had failed. An operation on a fresh fracture is not difficult. It is no more difficult to operate upon a recent fracture than to do any other major operation. Surgeons all over the state are doing operations for hernias, appendices, diseased gall bladders, ulcers of the stomach, et cetera, and the same technique carried out is sufficient for the fractures as far as asepsis is concerned. The same is probably not true of old ununited fractures, and they are a difficult group to operate upon. Handling of tissues is greater, exposure to the air is longer and infection is much more apt to ensue. While I do not advocate the open operation in all cases, I think it certainly has its place.

DR. A. J. BRADEN, Duluth: I should like to call attention to one point, and that is, in the treatment of fractures the first thing is to reduce the fracture and hold it in position. Now, I think there is something wrong about that in a way. We see practitioners reduce fractures and then try to put on some kind of splints to hold them in place. The harder it is to hold the fracture in place, the tighter they put on the apparatus which of course is all wrong. In most fractures there will be one part of it that you have control of, and the other portion you have not control of and the idea is to get the parts you can control in alignment with the parts you cannot control and without circular constriction keep them in the alignment. Mobilization is all right. If you can accomplish it, you will have good function.

DR. A. E. BENJAMIN, Minneapolis: I have been very much interested in this paper of Dr. Green's, but I would take issue with him in regard to one point, namely, the treatment of certain types of fractures by splinting. I have always been able to obtain better results in certain types of fractures by the open operation. If a man is a careful surgeon, is clean, does good work, and does not tear a hole in his glove and has his hands clean before putting the gloves on, why should he have any infection in the operation on these cases. We operate on gall-bladder cases, on appendicitis cases, and take the same chances with infection. We should not have any infection. Lane's treatment of handling bone with only instruments is wrong I believe. If you see Lane operate in his small room you can see why he gets infection because he cannot well turn around in this room without touching something not sterile. If you are in a modern operating room, and you are clean and careful, you should not have infection after operation unless you have a case that is already infected. These patients seem to get out and get to work quicker as there is not any excess of bone exudate. The functional result is better, the muscles act more normally, the circulation is more perfect, and you get a better looking limb. I would not advocate the open operation in every fracture, but only in a few cases, particularly in cases where we cannot get good alignment, or where we cannot get union without

much exudate or interference with the muscle function. In certain fractures, especially in children, I have been able to obtain better results by elevating the leg and putting on extension, putting the limb in a perpendicular position. The weight of the body makes a better counter-extension. The mobilization of certain fractures as a method of treatment is all right. Our grandfather's and grandmother's method of massaging fractures and sprains was right. They got quicker results than by the later treatments of immobilization.

I have had two cases of recent fractures of the jaw, one double, and one single. I put these up for a short time, and inside of two weeks the patients were using the jaws to some extent and we got good results.

DR. C. B. LENONT, Virginia: Some of us are still advocating the open method perhaps as extensively and as frequently as we did several years ago. However, I do not believe we are doing as much open method work at the present time as formerly. The men who are doing most of the fracture work and who are familiar with it are not resorting to the open method as often as they have done in the past. I heartily agree with the writer of the paper that the better method of treating fractures is by making every effort possible to overcome the fracture by the older methods with weights or by an effort at reduction perhaps under complete anesthesia with the aid of the fluoroscope. Many times we are surprised how well these fractures are maintained after we have used deep anesthesia.

I think perhaps I was a pioneer in the treatment of fractures by the open method. For twenty years I have been treating some fractures by the open method, and I became quite an enthusiast for a time in treating fractures by the open method. I do not do it so much any more. If a fracture cannot be maintained by the ordinary method, then perhaps the open method is the best method to resort to. I would not hesitate to resort (and I have done it in the past) to the open method of treatment of fractures in children. You will find fractures of the thigh in children or fractures immediately above the knee joint that are almost impossible to maintain by the ordinary methods, and in these cases I would not hesitate to use the open method. I am proud to say that of all my fractures treated by the open method, I have never had a case of infection. I think if we are careful in our asepsis we can avoid infection entirely.

DR. C. W. MORE, Eveleth: I want to congratulate Dr. Green on presenting so practical a paper on the treatment of fractures. We have had some experience with the method of treatment he has outlined. In some instances in fractures of the thigh, an extension of forty pounds and the leg supported with sand-bags has resulted in a few days in almost perfect anatomical restoration of the parts. In other

instances this method will produce complete extension but the deformity will not be wholly corrected. For instance, in a transverse fracture the edge of one fragment may be just caught against the edge of the other, or sometimes not come quite in contact. This can frequently be overcome by proper padding, or more generally by abduction and flexion.

There is no method of treatment of fractures adapted to all cases. Where forcible extension and manipulation will not bring or hold the bones in position, an open operation is indicated. We not infrequently find muscles and fascia interposed between the broken bones, which accounts for the failure to get the proper position by the closed method.

One can hardly realize with what force the muscles pull the lower fragment of a fractured femur backwards. Several years ago, I had a case of compound fracture of the femur about five inches above the lower end. I could see through the open wound in the soft parts the bones overlapping about two inches. The upper end of the lower fragment was pulled backward about an inch and a half or two inches. Extension was made by two assistants with proper counter-extension until the full length of the leg was obtained but the lower fragment was pulled further backward. I inserted two fingers in the wound underneath the lower fragment and, with the right hand placed upon the thigh above the upper fragment pushing downward firmly and pulling upward with my full force with the two fingers under the lower fragment, I succeeded in bringing the bones into correct position. The extension was released and the bones locked. As I slowly removed my hand and fingers from the bone, it immediately became displaced as before. It was a good ocular demonstration of the difficulty or rather impossibility of reducing this fracture without first tiring the muscles by extension.

In the treatment of fractures about the joint, Dr. Green and Dr. Corbett have given us a practical demonstration of the proper way to handle these cases early with gentleness and careful passive motion.

The closed treatment of fractures requires constant care and eternal vigilance. To a man who has many cases of fracture in conjunction with his other work, the closed treatment becomes irksome after some

years, especially when he finds that after painstaking care he does not always get the desired results, and he is not inclined to criticize the doctor who more often resorts to the open treatment of fractures. To one who has proper hospital facilities, the open treatment presents an irresistible temptation. He must be careful with his asepsis, and at the conclusion of the operation his worry is usually over.

DR. E. K. GREEN, Minneapolis, (closing): I want to thank the gentlemen for their discussion. I think I can dismiss the question of the open method of treatment of fractures because most of you have spoken about it and I have nothing to add except that operative treatment lengthens the disability. However, I operate a certain number of fractures every year because I cannot handle them according to the principles I have laid down in my paper.

I was glad to hear Dr. Ide's paper yesterday which dealt with the different kinds of apparatus used for handling fractures. You must be acquainted with all of them, but my observation has been that many times the doctor does not properly interpret the use of the weights, extension and counter-extension, etc. In regard to mobilization, I would like to refer you to the work of Champonniere, who introduced it some years ago in Paris. Dr. W. W. Richardson, of Los Angeles has been practicing it for fifteen years with very good results. He says almost any fracture can be reduced in this manner and that it is particularly applicable to children. You can massage these cases so that the children beg to go to the doctor because they know he can make them feel comfortable.

In regard to the use of splints, we try to hold the fragments without making the splints too tight. You should have correctly fitting splints which will hold the arm in good position so that he is absolutely comfortable until he comes back the next day to have the joint mobilized. This subject is a large one, and I have only touched on a few points.

Take a joint that is easily mobilized first. Until you know how to handle these patients, either yourself, your assistant or nurse is going to give them pain. You should learn to get results without pain. You can go from one joint to another, so that in time a great many fracture cases can be treated best this way and you will be able to get the patients out in the shortest time, according to this method.

A MECHANICAL DEVICE TO FACILITATE THE HANDLING OF PATIENTS IN THE WHITMAN ABDUCTION SPLINTS

OTTO F. SCHUSSLER, M. D.
Orthopedist Sivertsen Clinic
Minneapolis, Minn.

That the comfort of patients suffering from fracture at the hip joint has been much augmented by the employment of the Whitman abduction splint is generally acknowledged; nevertheless the care of these cases, even in this most comfortable of all dressings, is fraught with difficulties, which outside the well equipped hospital, at any rate, are well nigh insurmountable.

The maintenance of proper cleanliness of bed and body, the employment of the bed pan, the prevention of bed sores, the securing of that bodily rest and comfort which frequent change of position only can give, and the bolstering up of the patient's morale sufficiently to enable these usually aged and feeble persons to endure a long period of rigid confinement, are tasks which try to the uttermost the skill and patience of physician and nurse alike.

The conviction that these problems are in a great measure solved by the use of the mechanism employed by us and illustrated here, constitutes our excuse for offering this contribution to the already voluminous literature covering the subject of treatment of this desperate condition.

The device has been thoroughly tried out and has in all cases in which the Whitman treatment could reasonably be employed, contributed greatly to the comfort of the patient while lessening the work of the nurse. Light patients are of course, more easily handled than the very heavy ones but by simply increasing the size or number of pulleys employed the heaviest patient can be moved about as desired.

The essential feature of the mechanism is the belt shown in Figure 1. This is simply a strip of canvas 6 inches wide and 60 inches long with a stout iron ring securely attached to either end. This belt is brought into service by means of an ordinary block and tackle

arrangement attached to an overhead rail which is supported by a balkan frame.



Fig. 1

If it is desired to change the bed linen or use the bed pan, the belt is slipped under the patient at the level of the iliac crests, the rings thrown over the hook attached to the lower block, the patient raised clear of the sheet, and the pulleys locked in position. The patient meantime steadies herself by grasping the strap attached to the overhead rail as shown in Figure 2. The necessary manoeuvres are made deliberately, unattended by suffering on the part of the patient or undue trouble for the nurse.

In turning the patient over in bed for the purpose of caring for the skin of the back and giving rest, the nurse proceeds as follows (Figs. 3, 4 and 5): Standing at the uninjured side of the patient with the belt so placed that its middle is under the midline of the back at the level of the iliac crests, the nurse raises her clear of the sheet and pushes her gently to the far side of the bed and there lowers her. The rings are removed from the hook and the belt drawn through under the patient until one ring rests against the cast just behind the anterior superior iliac spine on the side of the injury. The rings are replaced on the hook and the slack in the belt on the uninjured side is taken up by pressing it down upon the cast over the abdomen, holding it there rather snugly while traction is made on the rope. As the body



Fig. 2

the process of turning as described above. If the patient has been worked too far downward in bed in turning her over it is only necessary to move the tackle toward the head of the bed a few inches as shown in Figure 7, when on raising her slightly she will automatically float up into the desired position. If she is found to be too far toward the head of the bed the process is reversed. Other useful purposes such as will suggest themselves to the physician during the treatment of the case are readily served by this cheap and simple device.



Fig. 3

rises from the bed the slack in the belt is gradually fed out and the patient automatically rolls toward the nurse. When she has been rolled a little more than half way over she is slowly lowered, the nurse meanwhile rotating her body by grasping the cast at the level of the knee and drawing it toward her so that when the patient has come to a prone position the toes on the injured side just clear the edge of the mattress. The patient is given a pillow and is now in a comfortable position in which to lie while the back is being cared for. Pads of absorbent cotton wrapped in gauze, which have been packed between the body and the cast to protect the bony points are removed; the skin, as far as it can be reached is bathed with alcohol and massaged and the pads replaced. The part of the cast distal to the knee joint having been bivalved (Fig. 6) the posterior portion is removed and the ankle and knee joints flexed and extended and the calf muscles massaged. This arrangement makes possible the prevention of stiffness of the joints mentioned and is a very necessary provision. The removable part of the cast is then replaced and held with tape straps, the patient's hair dressed, and such other matters attended to as may contribute to her comfort.

She is now ready to be turned onto her back. This is done by readjusting the belt so that the ring on the injured side lies over the anterior superior spine of the ilium and then repeating

During the first few days, or until the patient has been convinced of the safety of the procedure it is advisable for the physician to supervise the manoeuvres but after the first week the nurse alone or with such assistance as may be found in any home can easily carry them out. It will be noticed that in the case here illustrated the position of abduction was not employed because it was deemed unwise in this particular instance to break up the impaction. Abduction of the limb however in no way interferes with the use of this mechanism.

That the end results of treatment of fracture of the hip have shown much improvement since the Whitman method has come into more general use is, we think, undeniable. Just how much of this improvement is the result of more



Fig. 4



Fig. 5



Fig. 6



Fig. 7

accurate adjustment and better fixation of the fragments and what part is to be credited to the encouragement of constructive metabolic processes by the promotion of bodily comfort and the avoidance of infection (hypostatic pneumonia, septic bed sores, etc.) is a nice question and one not easily answered; but that the latter factor is a large one would seem to

admit of no question. In our experience the employment of the above described device has made possible the maintenance of an excellent state of general health in these patients throughout their necessarily prolonged period of confinement and we believe that the good effects of this condition of general well-being have been reflected in the end results obtained.

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EDITORIAL

REPORT OF THE COMMITTEE ON MEDICAL PROGRESS OF THE SOUTHERN MINNESOTA MEDICAL ASSOCIATION

One year ago the committee on Medical Progress was appointed at the suggestion of the executive committee of the association. The object of this appointment was to determine the advisability of having a committee of this character to assist the membership of the association directly in medical matters and to promote more careful record taking and investigation of the early manifestations of disease as observed by physicians in general practice. Your committee has reached the conclusion that a permanent committee of this type would be an asset to the association.

(1). It could act as a means by which anyone in the association could be put in touch with those especially qualified to assist them in special problems or with technical information.

(2). It could probably place at the disposal of the members, through the libraries of the State institutions, the important bibliography on any subject to be specially investigated.

(3). It could obtain and crystalize the sentiment of the association concerning any problems of general medical interest or of special importance to the general public.

(4). It could acquaint the members of the association with information concerning epidemics.

(5). And transmit to the members important information concerning the use of drugs and the treatment of disease.

(6). Encourage investigation and the publication of papers by physicians in general practice on topics which they are best qualified to discuss.

(7). Obtain and collect from members of the association data on the early symptomatology of disease.

There would doubtless be other ways in which this committee could be of assistance to members of the association. Whether its work would be valuable or not would depend largely on the freedom with which it would be made use of by the individual members.

As a concrete suggestion at this time it is proposed that some member of the society, preferably one in general practice, be appointed to report at the summer meeting of 1922 a collaborative study on "The Early Symptomatology of Poliomyelitis," the information for this report to be obtained from as large a percentage as possible of the membership of the association.

Walter H. Valentine, M. D.

S. Marx White, M. D.

H. Z. Griffin, M. D.

Nov. 30, 1921.

Chairman.

PROFESSOR ADOLPH LORENZ

The occasion of Professor Lorenz's second visit to America has been the source of much newspaper sensationalism and 'twere well to make known the truth of the situation as accurately as can be learned. It must be confessed that the newspaper interpretation of the situation made every right thinking physician blush for his profession. What are the facts?

Some years back Dr. Lorenz, who had gained a world-wide reputation through his development of a technic for the reduction of con-

genital dislocation of the hip by means of manipulation and fixation, added to his notoriety when he came all the way from Vienna to Chicago to perform the much heralded "bloodless operation" on a Chicago heiress. The fee, in itself a fortune, was made public and gave the newspapers material for sensational headlines.

In the prewar days many American physicians made a point of visiting Dr. Lorenz's clinic in Vienna and there saw a venerable and amiable university professor at work. As a result of the depreciation of the krone, wealth in Austria has ceased to exist. Those who were once well-to-do, today have nothing, expressed in terms of their national medium of exchange, and even less, expressed in American dollars. There is no doubt but that Dr. Lorenz has suffered financially in exactly the same way as all the other well-to-do Austrians. To make a trip to this country and visit in New York requires cash, and we know that Dr. Lorenz intended and expressed his intention of collecting and actually did collect fees from private patients in New York, although the newspapers failed to give prominence to these facts. What was heralded in the news columns was that Lorenz was making a trip to this country to treat the needy in expression of Austria's gratitude to America for what has been done for Austria since the war.

Now it seems self evident that fees were quite necessary to make this trip possible. We can excuse Dr. Lorenz for assuming that there would be no criticism of his doing private practice in America inasmuch as no public objection had been raised on his previous visit. And we cannot blame the venerable visitor for all the publicity associated with his visit. The American surgeons in whose hands Dr. Lorenz has placed himself have certainly been indiscrete in charging large fees for his consultations.

Publicity is worth dollars and cents in professional just as in mercantile activities. Advertising is strictly unethical according to present day medical standards. How easy it was, then, for the New York group to take advantage of the free advertising given this visiting surgeon. Cripples flocked to see the widely heralded visitor, services were not all furnished

gratis as advertised, and many hopeless cripples were bitterly disappointed. We do not wish to criticize our visitor, but we do severely censure our own countrymen who took advantage of the situation for their own gain.

Lorenz's visit may have been quixotic in the sense that American children are more in need of his services than the Austrian children. Then, too, the original Lorenz operation has been much modified and improved in the past eighteen years, both in Europe and America.

In answer to the criticism that the surgeons of this country would allow professional jealousy to deprive the cripples of this country of superior professional treatment, we would point to the recent visit of Colonel Smith, who toured the country demonstrating his cataract operation gratis without a ripple of criticism as to the ethics of the visitor.

MINNEAPOLIS OFFICE

Minnesota Medicine takes pleasure in announcing that it has leased quarters at 210 Commercial Building, Third Street and First Avenue, North. The Minneapolis office has been opened to more adequately serve the physician of Minneapolis and a growing clientele of advertisers in the Minneapolis district. The telephone number is Atlantic 2716.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

The Minnesota Pathological Society of the University of Minnesota held a very interesting meeting on the evening of January 13, 1921, at which a paper by Dr. J. C. Bloodgood, of Baltimore, was read, entitled "Tumors of the Breast."

A branch of the Society of Experimental Biology and Medicine (New York) has been formed at the University of Minnesota and holds its meetings every alternate month. Except the branch on the Pacific Coast, this is the only other branch of this Society outside of New York.

The first meeting was held on October 12, 1921. The following officers were elected: A. D. Hirschfelder, executive secretary; F. H. Scott, L. S. Palmer, E. J. Lund, E. C. Kendall, council.

The second regular meeting was held at the Minnesota Union on Wednesday, December 14, 1921, and was preceded by an informal dinner. The following papers were presented and will appear in the regular proceedings of the society which are edited in New York:

- (1) A. T. Henrici: A Statistical Study of the Form and Growth of a Spore-bearing Bacillus.
- (2) R. E. Scammon: A Comparison of Bodily Growth of Fetuses, Premature Infants and Normal Children in the First Year.
- (3) E. D. Brown: An Undetermined Principle Obtained from Poison Ivy.
- (4) L. S. Palmer: The Effect of Heat on the Calcium Salts and Rennet Coagulability of Cow's Milk.
- (5) George Fahr: The Velocity of Development of the Demarcation Current in Muscle.
- (6) A. D. Hirschfelder and H. H. Jensen (by invitation): The Pharmacological Action of some Ethers and Esters of Saligenin.

OF GENERAL INTEREST

Dr. Alberta Green, of the state hospital staff, St. Peter, spent the holidays in New York.

Dr. G. E. Sutton, of Rochester, has moved to Texas, where he will engage in the practice of medicine.

Dr. G. D. Mahon, of Rochester, and family have moved to Texas where they will reside in the future.

Drs. E. R. Bray and J. L. Shellman announce the removal of their offices to 342 Lowry Building, St. Paul.

Dr. H. M. McIntire, of Waseca, has been in Chicago recently where he took a two weeks medical short course.

Dr. Courtice Eshelby, of St. Paul, announces the opening of a Clinical Diagnostic Laboratory at 412 Lowry Building.

Dr. Lewis Gregory Cole, prominent roentgenologist of New York City, recently delivered a lecture at the Mayo Clinic.

Dr. Carman was elected president of the Radiological Society of North America at the recent meeting in Chicago.

Dr. L. W. Satterlee, who has been practicing in Alexandria for the past sixteen years, has recently located at Parkers Prairie.

Dr. Charles H. Gordon, late with the Sluder Clinic, St. Louis, has become associated with Dr. W. W. Lewis, 836 Lowry Building, St. Paul.

Dr. A. H. Brown, of Pipestone, recently returned from Chicago, where he has been taking a special course in surgery at the Presbyterian Hospital.

Dr. H. W. Froehlich, of Thief River Falls, attended the annual convention of the Western Association of Surgeons held at St. Louis during December.

Dr. B. C. Bernard, formerly connected with the Sand Beach Sanatorium at Lake Park, has accepted a position with the county sanatorium at Wabasha.

There is a good opening for a doctor at Underwood, Minnesota. This is a good town with large contributing territory, and nothing to buy. For

further information address Independent, Underwood, Minnesota.

The West Central Minnesota Medical Society recently held its annual meeting at which Dr. C. R. Christenson was elected president; Dr. Amos Leuty, secretary.

Dr. J. M. Fisher, of Virginia, Minnesota, has recently located in St. Peter, where he has secured the offices formerly occupied by the late Dr. George E. Merritt.

Dr. W. E. H. Morse was elected president of the Rice County Medical Society at its recent annual meeting, and Dr. C. M. Robilliard was re-elected secretary-treasurer.

The Kandiyohi-Swift County Medical Society recently held its annual meeting at which Dr. P. C. Davison of Willmar was elected president, and Dr. John C. Jacobs secretary.

Dr. O. F. Mellby, of the Thief River Falls Clinic, announces that he has given up general practice and will in future engage only in treatment of diseases of the eye, ear, nose and throat.

Dr. Palmer L. Bowdish, who has been engaged in work for the Massachusetts State Board of Health for several years, has accepted the office of superintendent of the Sand Beach Sanatorium, at Lake Park.

Dr. and Mrs. J. J. Gelz, of Richmond, Minnesota, sailed recently for Italy where Dr. Gelz will study for a year or more. Dr. Pfaff will be in charge of the hospital at Richmond during the absence of Dr. Gelz.

Dr. O. N. Meland, of the Warren Clinic, has just become a Fellow of the College of Physicians and Surgeons of America. Dr. Meland is on the staff of the Kittson County War Veterans Memorial Hospital.

Dr. Campbell P. Howard, Professor of Medicine at the University of Iowa, gave a Mayo Foundation Lecture, December 30, in the Assembly Room; his title was, "Personal Reminiscences of Sir William Osler."

At the recent annual meeting of the Waseca County Medical Society the following officers were elected for the ensuing year: President, Dr. J. F. Lynn; vice president, Dr. H. Hagen, secretary, Dr. H. A. Miller.

The Mower County Medical Society recently held its annual meeting at Austin, at which time the following officers were elected: President, Dr. E. H. Morris; secretary, Dr. P. A. Lommen; treasurer, Dr. A. E. Henslin.

Dr. J. C. Litzenberg, Professor of obstetrics at the University of Minnesota, gave a Mayo Foundation Lecture, December 16, in the Assembly Room; his title was, "Some milestones in the history of obstetrics and gynecology."

The annual meeting of the Red River Valley Med-

ical Society was held during December, at which the following officers were elected: President, Dr. H. M. Blegen, Warren; vice president, Dr. O. E. Locken; secretary-treasurer, Dr. Lyle Brown.

At the recent annual meeting of the Nicollet-LeSueur County Medical Society the following officers were elected for the ensuing year: Dr. H. B. Aitkins, president; Dr. J. W. Daniels, vice president; Dr. J. E. LeClerc, secretary; Dr. D. MacDougald, treasurer.

Drs. Samuel Lemberg, Edward C. Kendall, L. G. Round tree, Norman Keith, Walter Boothby, Henry Holmholz, Frank C. Mann and E. C. Rosenow, the Mayo Clinic, Rochester, attended the medical meeting at New Haven, Conn., in December, where they read papers before the American Physiological Society.

It was erroneously stated in a recent issue of Minnesota Medicine that Dr. W. J. Mayo was a member of the committee which went to China to attend the opening of a large hospital established by the Rockefeller Foundation. Dr. Mayo was invited to be present at the ceremonies but was unable to accept the invitation.

The Medical Forum, of St. Paul, was organized in December 1920 for the purpose of promoting interest and discussion in the field of the medical sciences. The membership is limited to fourteen, being composed of members of the Ramsey County Medical Society, or those eligible to it. The meetings of the Medical Forum are held each month at which papers are presented, the discussion following being entered into by every member present.

NEWS OF THE HOSPITALS

Dr. A. H. Kaplan, pathologist at St. John's Hospital, St. Paul, has been promoted from lieutenant to captain in the Medical Corps of the Minnesota National Guard.

Five additional nurses have recently entered the training school of St. John's Hospital, St. Paul.

The West Side Hospital, St. Paul, held its commencement exercises on the evening of January 10th, at which five nurses received their diplomas.

Drs. Leo. Hilger and A. H. Kaplan, of the staff of St. John's Hospital, St. Paul, recently read papers before the Barron, Wisconsin, Medical Society.

CORRECTION

In the January issue of Minnesota Medicine, in the list of physicians licensed at the October 1921 examinations, names of three licensees were incorrectly spelled. The name of Rudolph Geo. Andreas should read Rudolph Geo. Andres; Evelina Wilhelmina Eframann should read Evelina Wilhelmina Ehrmann, and Carl Aaron Hwer should read Carl Aaron Hyer.

PROCEEDINGS OF THE MINNESOTA ACADEMY OF MEDICINE

Meeting of December 14, 1921

Dr. H. L. Staples presiding.

Dr. A. E. Benjamin reported the following case:

E. T., age 40, male, married, Canadian, traveling man, heavy smoker. **Diagnosis:** mediastinal fibroma; multiple adenomata of thyroid. Family history negative. Personal history of Bright's disease and dropsy 21 years ago; in bed 28 months. Operation 2 years ago for pleurisy, no fluid found, severe hemorrhage and nearly bled to death. Was told liver was on wrong side and had been cut into. Noticed heart beat on right side and x-ray showed stomach on right side also. Neck began to enlarge 2 years ago following operation. At that time began to have spells, coming on in morning while still in bed, convulsive movements, occasionally unconscious, ending in noisy sleep. Duration 30 minutes to 6 hours. Interval 2 days to 1 month. Less frequent but more severe of late. No prodromata. Followed by increased dyspnea and gas on stomach and more recently by marked weakness.

Examination: Tonsils somewhat reddened. Adenoma of thyroid, larger on right. Superficial veins very large, especially of neck and upper thorax. Heart on right side apparently normal. Right chest apparently normal. Left chest; no breath sounds except at apex and parasternal and paravertebral near base of left chest. Dulness constant over remainder. Abdomen: increased tympany. External hemorrhoids. Extremities: very marked transitory edema of ankles and legs.

Laboratory: Hb. 80 per cent. P. S. P. 77 per cent. Blood pressure 134/90 to 120/80. Basal metabolism plus 16. Wassermann negative. Urine: (9/17/21) alk., 1011, albumin ++; sugar 0; pus, few; R. B. C. 50 per H. P. On 11/16/21 it showed alk., 1014, albumin 0, sugar 0, pus occasional, R. B. C. few.

Patient admitted to hospital in comatose condition which had been present the past 18 hours. Breathing stertorous and labored. Breathing with less effort when lying on left side. Admitted to hospital November 21 and died six hours later.

Pathologist's report (Dr. B. J. Clawson): The body is that of a well-developed poorly-nourished man, 166 cm. in length; estimated weight 125 pounds. Rigor mortis is present. There is hypostasis posteriorly. No edema. Cyanosis present on face. No jaundice. Pupils are equal and regular. Veins of neck are markedly dilated on both sides. There is an old healed scar about 15 cm. long in the 5th interspace in the anterior axillary line. There is a pigmented area over the left scapula. The right pleural cavity is free from fluid and adhesions. The left cavity is completely obliterated by a white, hard,

nodular mass which extends about 5 cm. to the right in the midsternal line. This mass is adherent by dense fibrous adhesions to the parietal pleura and to the old operative wound. It is also firmly attached to the posterior mediastinal tissues. Heart weighs 350 grams. Lies in right pleural cavity. The wall of the right ventricle is thickened. Valves seem normal. The muscle is firm and of a dark red color. The root of the aorta shows no sclerosis. The left lung weighs 300 grams and shows no crepitation throughout. It is pushed into the apex of the cavity. The right lung weighs 670 grams. It is dark in color and on section frothy bloody fluid exudes on pressure. Each kidney weighs 200 grams. They are dark in color. The capsules strip readily leaving smooth surfaces. The cortical markings are well preserved. The thyroid is markedly enlarged, weighing 250 grams. The enlargement is in both lobes, shows many nodules and on section small cysts containing colloid and blood are found.

The tumor mass weighs 12.5 pounds and completely fills the left pleural cavity except a small space at the apex. It is firmly attached to the diaphragm, to the old operative wound, and to the posterior mediastinal tissues. It is hard, roughened and well circumscribed. It measures 27 cm. vertically, 22 cm. transversely, and 12 cm. anteroposteriorly.

Microscopic examination: The tumor is a fibroma, showing extensive hyalinization.

Diagnosis: 1. Mediastinal fibroma. 2. Multiple hemorrhagic adenomata of thyroid with colloid degeneration. 3. Right bronchopneumonia.

Discussion by **Dr. A. Schwyzer**: Fibromas of the mediastinum are very rare. There had been only 5 or 6 reported at the time last year when I reported a case of fibroma. Observed case for 4 months. Patient did not want operation because pain was not sufficient. Later when pain increased the operation was done. We inflated the lungs and had to split the manubrium to get it out. That operation was done 2 years ago. We fluoroscoped him a while ago and the lung field was entirely clear.

Dr. H. L. Ulrich reported two heart cases.

Case 1. Mr. S., age 53. Farm and dealer in real estate. Complaint: heart trouble. F. H.: cardiac.

Personal history: Always a weakling physically; had pneumonia as a child. Denies venereal disease. Has had several attacks of tonsillitis. Has had a maxillary sinus washed out. No previous cardiac history of dyspnea, palpitation. No pain. No cough.

Present illness: Last three years feeling peopless and easily tired out. In May 1921 had an attack of dizziness. Consulted physician and was told he had a weak heart muscle. In June he had another attack of dizziness on exertion. Had subsequent attacks and determined to lie down. In July he consulted another physician and told to go to bed. In bed 2 weeks when chiropractor took charge, who

made matters worse. In September consulted another physician who put him to bed for a month. He was then seen by Dr. Head, who advised another month flat on his back. He consulted us the latter part of October. At that time his physical examination elicited the following facts:

Spare man, with no physical findings except mild pyorrhea, chronic amygdalitis, questionable cholecystitis, and a heart extremely irregular, rapid, not increased in size. No thrills or shock. A soft systolic bruit at the apex following a snappy 1st sound, along left of sternum a diastolic bruit is heard, and at the base a to-and-fro murmur is made out. Blood pressure when first seen varied systolic up to 160, diastolic 80, and sounds at the cuff varied in intensity. All came through at 120. His blood picture, urine and Wassermann are normal. Lack of enlargement of heart and its rapid irregularity made us suspect auricular flutter or possibly nodal rhythm. The electrocardiograph disclosed the condition.

Electrocardiogram taken on 10/29/21 showed auricular flutter, auricular rate 230 and ventricular 110. Also a right-sided preponderance. The degree of functional block varied, giving a complete irregularity, but the majority of complexes showed a 2 : 1 block. The vital capacity of the lungs when first seen was 3100 cc. An electrocardiogram taken 2 days later on admittance to the hospital again showed flutter with auricular rate 230 and ventricular 80. More of the complexes showing higher grades of block. He received 12 cc. of Tr. Digitalis, University of Minnesota leaf, standardized 65 mg. to cat unit, in 24 hours. He left the hospital 11/3/21 with pulse still irregular but slow. On 11/8/21 electrocardiogram showed completely different form. Ventricular rate varied between 40 - 50. The majority of complexes showed no definite auricular wave, with rhythm probably arising in the auriculo-ventricular node. There were occasional series of 3 or 4 complexes with well-developed P-waves and varying P-R intervals. On 11/15/21 practically all complexes showed a single P-wave for each ventricular complex with varying P-R intervals. Occasionally the P-wave was absent. Tracings taken weekly during the following 3 weeks showed a normal cardiogram except for right-sided preponderance, slightly widened Q-R-S, and marked sinus arrhythmia. His vital capacity rose to 3800 cc.

Case 2. (Dr. Nathanson's case.) Dr. O. A., age 24, dentist. Complaint of palpitation, depressed feeling. F. H. negative except sister died of diabetes.

Personal History: Always good. Mixed in athletics without difficulty. No illness except occasional attacks of tonsillitis. Tonsillectomy 5 years ago. Small tag of tonsil tissue left. Habits O. K. except excessive cigarette smoker.

Present illness: Two days before seen was in gymnasium partaking of strenuous game of hand ball. Suddenly became dizzy and felt faint. Had to lower his head between his knees or would have fainted.

Felt cold and looked white. Cold sweat broke out. Felt weak and faint for about one-half hour. At this time became conscious of his heart beat and it felt irregular. Has been feeling depressed since and easily tired out.

Physical examination: Essentially negative. Heart not enlarged, completely irregular, first sound at apex somewhat snappy, P_2 accentuated. Blood pressure 130/90. V. C. 4400, normal. Laboratory examination negative.

Electrocardiogram taken when first seen on 11/11/21 showed auricular fibrillation rate 70-80 and slight right ventricular preponderance. As he showed no evidence of cardiac insufficiency he received no digitalis and was merely advised to restrict his activities, as his fibrillation was considered a transitory one resulting from his acute cardiac overstrain. The fibrillation persisted, however, and on 12/5/21 he was put on quinidine sulphate gr. v. three times a day. After his 4th dose the palpation and precordial discomfort disappeared. When seen his pulse was slow and regular. Electrocardiogram taken on 12/7/21 showed normal rhythm with rate of 60.

Dr. Chester O. Tanner presented the following case for **Dr. Franklin R. Wright**.

Case of melanoma with no signs of recurrence 9.5 years after operation.

Case No. 20463. H. P., 41 years of age, male, was admitted to the hospital May 16, 1912 because of a purplish colored tumor growth on inner aspect of right leg. He gave the following history:

Ever since boyhood he could remember a small raised pigmented mole on right leg. In his work as a mail carrier he rode a bicycle and the mole rubbed against the bicycle frame. About a year previous to admission the mole suddenly began to grow, increased rapidly in size and bled easily. Examination on admission to the hospital showed an elevated purplish colored tumor mass the size of a hickory nut on inner aspect of right leg. No metastases or glandular involvement was found.

Operation: May 17, 1912. Tumor with adjacent oval-shaped area of skin and subcutaneous fat 8 cm. x 5 cm. in size was removed.

Gross specimen is a purplish colored, roughened, tumor mass, 3.5 cm. in diameter, elevated 1 cm. above the skin surface, together with an ovoid area of skin 8 cm. x 5 cm. in size. Running out from the base of the tumor for a distance of about 1.5 cm. is an irregular indurated skin area. Microscopic sections through the main portion of tumor show a slightly thickened squamous epithelial surface beneath which are large masses of epithelioid-like cells separated by dense connective tissue septa. These cells are polygonal or fusiform in shape, with thin processes. These processes in many of the cells contain brownish yellow pigment granules. Within the connective tissue cells of the septa and also in the interspaces are seen deposits of this pigment.

Diagnosis: Malignant Melanoma.

Subsequent History: June 1921, patient is still living and well with no signs of recurrence more than 9 years after operation.

In reviewing the literature upon the rapidity of growth and mortality of malignant melanomata in general, we find an early death in most instances and few cases where a recurrence was prevented for a long period of time. Bloodgood has careful personal notes of 65 cases of malignant pigmented moles. These cases were collected from various sources. In every instance the diagnosis was confirmed by a pathologic examination. Up to the present time there is not a definitely cured case among them. Just collected 57 cases which lived on an average of 3 years from the time of the first observation of the tumor until death. Henocque reported a case of melanoma of the axillary gland which existed 9 years up until the time of the patient's death from pyemia. Later Schilling described a similar tumor which developed on the inner side of the left knee, and, growing slowly since puberty, existed 20 years up until the time of death from numerous metastases. Eves analyzed the records of melanomata in the London Hospital during a period of 25 years and found 45 cases, of which 33 occurred in the skin. Out of this number 26 began in pigmented moles. The average duration of life in his series was between 2 and 3 years and one prolonged as long as 11 years. In still another case—a melanoma of the dorsum of the hand—involvement of the lymphatics of the arm and axilla was delayed for 20 years.

Wilson and Kolteyer collected 13 cases but were unable to determine the exact length of duration of disease in all of them. The shortest course was measured by weeks, while in the longest, death occurred after a period of 10 years; the average duration slightly exceeded 3 years. Keen reported 3 cases, one of which showed no signs of recurrence 7 years after operation.

Broders and MacCarty were able to follow 38 patients with melanoma and found that 86 per cent (33 patients) died as follows:

Within 1 year after operation.....	24
“ 2 “ “ “	4
“ 4 “ “ “	1
“ 8 “ “ “	3
Dead, date unknown.....	1

The other five patients were followed and found to be living as follows:

1 year after last operation.....	2 patients
2 “ “ “ “	1 “
3 “ “ “ “	2 “

The average duration of life in this series after the last operation was 11 months and 3 days. (This includes a melanoma of the choroid which lived 8 years after operation.)

This paper does not include melanoma of the choroid, which condition seems to be quite different from that of the skin melanoma.

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Dr. W. F. Braasch, Rochester, Minn. presented 3 cases of duplication of the renal pelvis (Double Kidney).

Case 1 (A376487), Miss M. J., aged 32 years, came to the Clinic because of attacks of dull pain referred to the left upper abdominal quadrant and radiating to the lower quadrant; she had had attacks for 4 years, a severe one 1.5 years before. Recently the attacks had occurred every 8 to 10 days, or they lasted from 12 to 24 hours and were followed by a dull ache in the anterior part of the abdomen, often with flatulence and distress over the entire lower abdomen. Frequency was moderate. It will be noted that the pain was entirely anterior and not at all suggestive of renal involvement.

The systolic blood pressure was 98, the diastolic 66. The urinalysis was practically negative. The phenolsulphonephthalein return was 50 per cent in 2 hours and 15 minutes. Roentgenograms of the urinary tract, colon, and stomach were negative. A cystoscopic examination was made for the purpose of identifying the pain.

Both ureteral orifices were normal in location and appearance, the secretion of the right kidney was normal. A catheter introduced into the left ureter did not meet obstruction. 110 cubic centimeters of residual urine was withdrawn from the renal pelvis; there was only a faint trace of phenolsulphonephthalein in 15 minutes. A pyelogram of the left kidney showed definite dilatation of pelvis and calyces. The dilatation, however, did not appear sufficiently marked to account for the large amount of residual urine found in the renal pelvis, which we were at a loss to explain. A diagnosis of left hydronephrosis was evident. (Fig. 1.)

At operation the renal pelvis was found to be markedly dilated. The kidney tissue was evidently largely destroyed, and a nephrectomy was performed. On section of the kidney two definite segments of the renal pelvis was found, the upper of which was confined within the kidney proper; the dilated portion visible outside the kidney was directly related to the lower segment only. The two segments of the

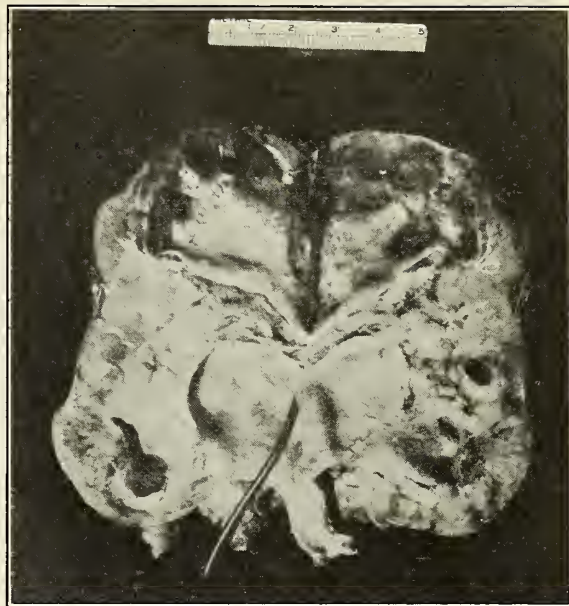


Fig. 1 (376487). Section of kidney showing duplication of renal pelvis with hydronephrosis of both. The two pelves are connected by adjacent calyces and have but one ureter.

pelvis were separated by a definite band of atrophied renal tissue and were connected by a narrow isthmus which corresponded to two adjacent calyces which had coalesced. The calyces were markedly dilated in both pelves. Only a narrow rim of cortical tissue remained which appeared to be atrophic.

Case 2 (A342668), Mrs. B. M., aged 30 years, came to the Clinic presenting symptoms of urinary frequency which had begun 11 years before and had



Fig. 2 (342668). Outline of the upper abbreviated pelvis in the double kidney as is usually observed. The lower pelvis is obliterated.

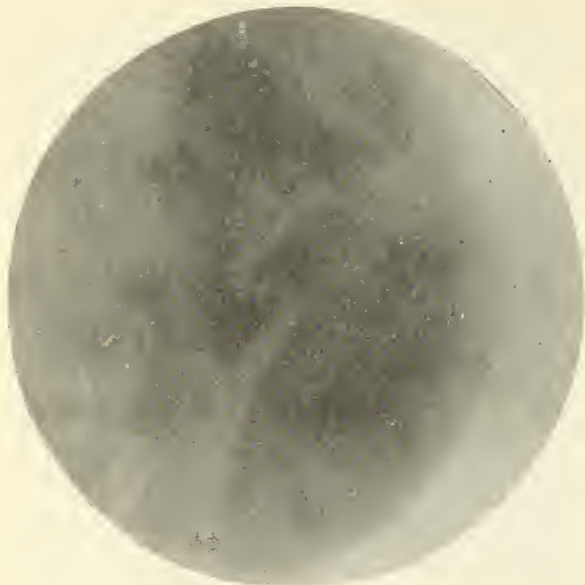


Fig. 3 (377195). Outline of the upper pelvis in the double kidney; the lower pelvis and its ureter obliterated. The point of juncture of the two ureters is shown where the ureter becomes dilated.

persisted at intervals since, and pain referred to the neck of the bladder. For 2 years the patient had had occasional dull pain referred to the left kidney area, but this had improved during the past year. Formerly she had occasional spells of epigastric distress. The general condition was suggestive of neurosis. There was no loss in weight. (Fig. 2.)

General physical examination, including roentgenograms of the urinary tract and chest, was negative. The systolic blood pressure was 100, the diastolic 55. A specimen of urine catheterized from the bladder showed but 20 pus cells to a high-power field of the microscope. The sediment was stained for the bacilli of tuberculosis and was negative. The phenol-sulphonaphthalein return was 50 per cent in 2 hours and 15 minutes. Systoscopic examination revealed a bladder with normal capacity, and, save for a few areas of slight inflammation, comparatively normal. The left ureteral opening was slightly eroded, with an inflamed area of mucosa and granulation tissue around it. Obstruction was met by the catheter introduced into the left ureter at a distance of 2 cm. from the opening, but at a subsequent examination the catheter passed into the ureter to a normal length without obstruction. Catheterized specimens obtained at the second examination from both right and left kidneys were normal. A pyelogram made of the left side showed a very small pelvis with abbreviated calyces. The ureter was but slightly dilated for a distance of several centimeters. Below this it was markedly dilated. A diagnosis was made of duplication of the pelvis and ureter with destruction of the lower pelvis (?), atrophic pyelonephritis (?), and tuberculosis of the left kidney (?).

At operation a double kidney with duplication of the pelvis and ureter was apparent. The lower pole of the kidney was atrophic and cicatricial. The two parts of the kidney seemed quite distinct, with a definite zone of demarcation. It was thought at first that the lower portion was atrophic as the result of cicatricial pyelonephritis, since no definite evidence of tuberculosis had so far been discovered. The lower portion was then resected without much difficulty. On microscopic section of the renal tissue at the line of excision areas were found containing a typical tubercles and giant cells. The remaining portion of the kidney was then removed even though no definite evidence of tuberculosis was found in the tissues removed from the line of excision.



Fig. 4 (377195). Exterior of the double kidney. The lower pole is atrophied and diseased; upper pole apparently is normal.

Case 3. (A377195), Mr. G. V. G., aged 35 years, came to the Clinic with symptoms beginning 15 years before with slight urinary frequency at irregular intervals. Seven years before he had had a period of dysuria with increased frequency and very cloudy urine which had continued over a period of several months. Since then he had had a diminished urinary disturbance with soreness and dull ache in the urethra. Five years before he had noticed hard painless nodules in the left epididymis, and two years before, the same condition in the right epididymis. One year before, he had had slight hematuria. (Fig. 3).

The general examination was negative save for

moderate chronic bilateral tuberculous epididymitis. The left lobe of the prostate was nodular. Roentgenograms of the urinary tract and chest were negative. A moderate amount of pus was found in the urine, and after repeated stains, acid-fast bacilli were found. The phenolsulphonephthalein return was 50 per cent in 2 hours. Cystoscopic examination revealed a slight cystitis. The urine from both ureters appeared to be normal. A catheterized specimen of urine from the right kidney was normal; that from the left kidney contained an occasional pus cell. The differential phenolsulphonephthalein test showed 20 per cent to be coming from the left kidney and 7 per cent from the right in 15 minutes. A pyelogram of the left side showed marked dilatation of the ureter; the pelvis and calyces were abnormally small. A diagnosis was made of tuberculosis of the left kidney. (Fig. 4).

At operation a double kidney with tuberculosis in the lower segment was found. The upper portion of the kidney appeared to be normal, while the lower segment was very evidently diseased and functionless. Since the bacilli of tuberculosis had been found in the urine, a complete nephrectomy was performed. On section of the kidney a sharp line of demarcation between the healthy and diseased portions was noted. On microscopic examination of the apparently normal tissue, however, several areas of encroaching foci of tuberculosis were observed. (Fig. 5).

Discussion by **Dr. A. Schwyzer**. We have to thank Dr. Braasch for bringing these interesting cases before the Academy. The marked infection of one portion of the kidney with practically complete free-

dom of the remainder of the kidney is very interesting.

In this connection I may mention a case where we found the upper pole of the right kidney in a young woman the seat of hundreds of minute abscesses. The patient had had chills for a week before. Finally she began to have some pain in the right loin. The urine was practically negative. We found just a trace of albumin and some pus cells coming from the right kidney. On cutting the kidney partly open by a longitudinal incision along its outer border, it was quite remarkable how all these abscesses were entirely located in the upper pole, and ended in a sharp line at the junction between the upper and the middle thirds. The lower two-thirds were entirely normal. It must have been that the infection, probably in the wall of the artery feeding this area of the kidney, caused these little septic emboli. We amputated the upper third of the kidney and the patient became normal in temperature within 48 hours and had a very smooth recovery. She remained well, is now married, and has had two children. I think it was quite valuable to save this kidney as in pregnancy, with possible ureteral difficulties, two kidneys make the condition surely safer.

I have never seen such a complete reduplication of the kidney pelvis in such a definite way without a double ureter.

Dr. W. A. Jones, Minneapolis, read a paper entitled "Cerebral Sinus Thrombosis, with Case Report of a Psychosis and Hemiplegia, with Autopsy."

Discussion by **Dr. A. R. Colvin**.

Some 15 years ago I was asked to assist at a head operation in the case of a young woman upon whom a diagnosis of brain tumor had been made. She was mentally unusually bright at the time of the operation. She had suffered from intense headaches for about one year; was totally blind. The blindness had come on gradually. At exploration nothing was found. The patient was relieved for a short time and then began to suffer again and it was decided to explore again on the other side of the head with a very large flap. The bleeding was so great at the time that the girl practically died on the table from hemorrhage from the diploic veins. At autopsy no gross pathology of the brain itself was demonstrable, but the longitudinal, the two lateral, the sigmoid and the occipital sinuses were found to be obliterated and represented by fibrous cords except here and there where a tributary vein entered and in these areas a small space remained.

The first interesting thing was that this girl was not mentally disturbed at any time. On the other hand she was particularly bright. The second interesting point was the gradual and increasing blindness with finally total blindness and great headaches. The third interesting point was the tremendous bleeding at the time of operation; due of course to the collateral venous circulation through the bone.

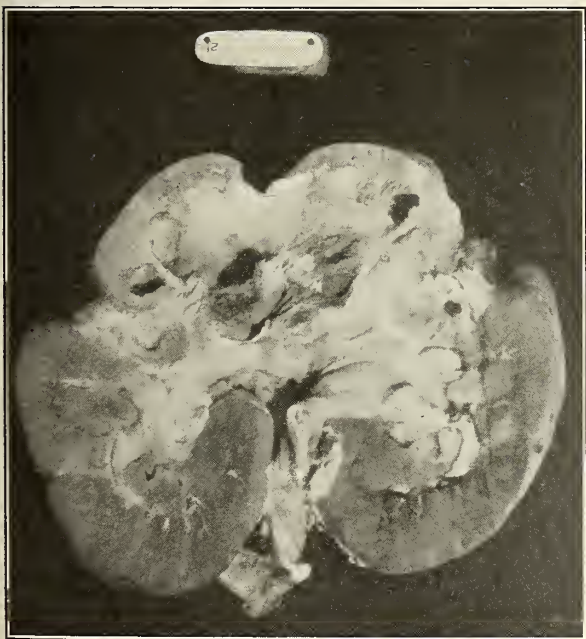


Fig. 5 (377195). The kidney sectioned showing the atrophied lower segment with dilated calyces and apparently normal upper segment.

I wish also to report a case of infectious sinus thrombosis as showing the relationship between blocking of the cerebral sinuses and disturbance of cerebral function.

A boy of 4 years, who had been ill for some time with enteritis, developed a left-sided suppurative mastoiditis. The mastoid was operated upon with subsidence of symptoms. In about a week later symptoms of mastoid trouble on the right side were noticed and a suppurative mastoiditis operated upon. The temperature which was 104 degrees continued however and some days later the right sigmoid sinus was opened, but no pathology demonstrated. The child's condition became progressively worse. The temperature remained high and irregular. Suddenly the temperature dropped to nearly normal. The pulse became less frequent, the child became unconscious, the head retracted, the pupils widely dilated with no light reflex present. After numerous consultations the consensus of opinion seemed to be that meningitis accounted for his symptoms. These did not, however, conform to the symptoms of meningitis as I had observed them, following mastoid infection, and I was quite sure that exploration for brain abscess would prove fatal under the circumstances. Shortly a swelling in the upper right neck, and a red streak along the direction of the great vessels to the clavicle, seemed to indicate jugular thrombosis. An operation for this condition was undertaken. A clot was found extending from the left sigmoid sinus (the side first operated upon) to the subclavian vein. The clot was removed and the vein excised; recovery ensued. The eyesight was restored. The boy is now mentally normal and bright. The facial veins have always stood out prominently. He had an operation for adenoids some years later and the bleeding was alarming. I suppose due to collateral channels being dilated. In this case, as in the one just reported, there had been no permanent interference with brain function as a result of bilateral blocking of the sigmoid sinuses.

This case and the two following ones emphasize again, as it has been emphasized by McEwen in the book on "Pyogenic diseases of the Brain and Spinal Cord," written many years ago, the necessity for hopefulness, and a running attack as pathology develops in any case of mastoid infection.

The next case was a young man thought to be beyond relief from pyemia as evidenced by a suppurating knee joint and several muscular abscesses. He was delirious. In a search for the cause of his pyemia, it was discovered that he had a suppurating otitis media with tenderness over his mastoid and along the course of the great vessels in the neck. The jugular vein was first exposed and found to be obliterated at about the middle of its course. On opening the vein above this point it was found to contain pus, and this extended up to the sigmoid sinus. After finishing the mastoid and sinus opera-

tion, the knee joint and numerous muscular abscesses were opened. Recovery followed.

The last case I wish to report was that of a young woman, 7 months pregnant, with mastoiditis, septic sigmoid sinus thrombosis and pneumonia with empyema. The mastoid sinus and empyema were drained. Recovery followed, and a living healthy child was born at term.

NEW AND NON-OFFICIAL REMEDIES

During December the following articles have been accepted by the Council on Pharmacy and Chemistry for inclusion in New and Nonofficial Remedies:

The Abbott Laboratories:

Neocinchophen-Abbott.

Powers-Weightman-Rosengarten Co.:

Mercury and Potassium Iodid-P. W. R.

Schimmel and Co.:

Oil of Cypress-Schimmel and Co.

E. R. Squibb and Sons:

Liquid Petrolatum-Squibb.

Food Allergens-Squibb.

Pollen Protein Allergens-Squibb.

Animal Epidermal Extract Allergens-Squibb.

Bacterial Allergens-Squibb.

Winthrop Chemical Co.:

Chaulmestrol.

Nonproprietary Article:

Chaulmoogra Oil.

CHANGE OF AGENCY: Cresatin.—The Council has directed that the description of Cresatin (New and Nonofficial Remedies, 1921, p. 94) be revised to show that the name has been changed to Cresatin—Dr. N. Sulzberger and that it is manufactured by the Intravenous Products Company of America, Inc.

Bromipin 10 per cent.—A bromine addition product of sesame oil, containing from 9.8 to 11.2 per cent of bromine in organic combination. It acts like the inorganic bromides; but since it yields its bromine more slowly, it is thought to have less tendency to produce brominism. Bromipin 10 per cent is said to be more lasting in its action than the bromides. The dose is 4 c.c. (1 fluidrachm), which may be increased in cases of epilepsy to from 8 to 30 c.c. (2 to 8 fluidrachms). Bromipin 10 per cent is a yellow oily liquid, having an oleaginous taste. Merck and Co., New York (Jour. A. M. A., Dec. 3, 1921, p. 1819).

Amylzyme.—An extract containing all of the digestive enzymes of the fresh pancreas of the hog. It has the power to digest starch and protein and to split fats. It is claimed that it is of value in digestive disturbances resulting from a deficiency of pancreatic secretion. Amylzyme is sold only in the form of 2 grain capsules. G. W. Carnrick Co., New York (Jour. A. M. A., Dec. 10, 1921, p. 1891).

Theobromine-P. W. R.—A brand of theobromine-N. N. R. For a discussion of the actions, uses and dosage of theobromine, see *New and Nonofficial Remedies*, 1921, p. 362. Powers-Weightman-Rosengarten Company, Philadelphia (Jour. A. M. A., Dec. 10, 1921, p. 1891).

Potassium Mercuric Iodide.—Potassii Hydrargyri Iodidum.—A complex salt, K_2HgI_4 , formed by the interaction of one molecule of mercuric iodide with two molecules of potassium iodide, containing about 25 per cent of mercury. Potassium mercuric iodide is used for the same purposes as mercuric iodide, over which it has some advantages because of its solubility. As a germicide, it is effective since it does not coagulate albumin; however, there seems to be no work to show how much the activity is decreased when an excess of potassium iodide is present. As a germicide, potassium mercuric iodide is used in concentrations of from 1:100 to 1:10,000. Solutions of potassium mercuric iodide may be prepared: (1) by dissolving one part by weight of mercuric iodide and one part by weight of potassium iodide in a small amount of water and then diluting to proper strength; (2) by dissolving potassium mercuric iodide in water containing potassium iodide, equivalent to about 20 per cent by weight of the potassium mercuric iodide used (Jour. A. M. A., Dec. 17, 1921, p. 1971).

Mercury and Potassium Iodide-P. W. R.—A brand of potassium mercuric iodide-N. N. R. Powers-Weightman-Rosengarten Company, Philadelphia (Jour. A. M. A., Dec. 17, 1921, p. 1971).

Diphtheria Toxin-Antitoxin Mixture-Squibb.—Each cubic centimeter of the mixture represents 3 L+ doses of diphtheria toxin and three units of diphtheria antitoxin. It is marketed in packages of three 1 cubic centimeter ampules representing one immunizing treatment; also in packages of thirty 1 cubic centimeter ampules. For a discussion of the actions and uses of diphtheria toxin-antitoxin mixture, see *New and Nonofficial Remedies*, 1921, p. 282. E. R. Squibb and Sons, New York (Jour. A. M. A., Dec. 17, 1921, p. 1971).

Oil of Cypress-Schimmel and Co.—A brand of cypress oil-N. N. R. For a discussion of the action and uses of cypress oil, see *New and Nonofficial Remedies*, 1921, p. 95. Fritzsche Bros., New York (Jour. A. M. A., Dec. 17, 1921, p. 1971).

Xeroform-S. and G.—A brand of bismuth tribromphenate-N. N. R., for a discussion of the actions and uses of bismuth tribromphenate, see *New and Nonofficial Remedies*, 1921, p. 71. Schering and Glatz, New York (Jour. A. M. A., Dec. 17, 1921, p. 1971).

Theobromine and Sodium Acetate-P. W. R.—A brand of theobromine sodium acetate-N. N. R. For a discussion of the actions, uses and dosage of theobromine-sodium acetate, see *New and Nonofficial Remedies*, 1921, p. 363. Powers-Weightman-Rosen-

garten Company, Philadelphia (Jour. A. M. A., Dec. 24, 1921, p. 2061).

PROPAGANDA FOR REFORM

Quinidin in Heart Disease.—Quinidin has suddenly leaped into prominence because of its striking effects in certain forms of cardiac irregularity. To see a heart that has been constantly irregular for one or two years because of a fibrillating auricle lose its lawless and rapid beat within a few hours under the influence of this drug and resume normal rhythm and rate and maintain these for months, must attract the attention of all. The conclusions of the few clinicians who have thus far reported their investigations are in remarkable agreement as to the fact that in about half of these cases of auricular fibrillation, quinidin is capable of restoring to the sino-auricular node the control of the heart, so that, for a time at least, the working of the heart is normal. However, while those who report on the effects of quinidin are fascinated by the possibilities of the application of this drug in medicine, they are wisely conservative in their statements and frankly admit that much is yet to be learned concerning its proper use. It is to be hoped that the few favorable reports will not lead to the indiscriminate use of the drug in every type of irregular and rapid type of heart (Jour. A. M. A., Dec. 3, 1921, p. 1822).

Oxygen Therapy.—The difficulties of oxygen therapy do not lie in any danger from undue intake of oxygen, for no abnormal increase in vital processes occurs even when mixtures very rich in oxygen are inhaled. The problem is rather one of technic in securing an actual introduction of more oxygen into the lungs under mechanical conditions of tolerable comfort. The usual haphazard methods of oxygen administration are of slight avail. When oxygen was administered with effective breathing devices in cases of cardiac insufficiency, relief of cyanosis and slowing of the pulse were secured. In pneumonia, the results were sufficiently impressive to permit the conclusion that oxygen therapy assumes a rational role in the treatment of the disease (Jour. A. M. A., Dec. 3, 1921, p. 1820).

Butyn.—The Council on Pharmacy and Chemistry reports that butyn is the name applied by The Abbott Laboratories to a new local anesthetic proposed for use in place of cocain in surface anesthesia in the eye and for anesthesia of other mucous membranes. Butyn is a chemical body, of definite, nonsecret composition, namely para-aminobenzoyl-gammadinormal-butylaminopropanol sulphate. Pharmacologic investigations indicate that butyn may take the place of cocain for surface anesthesia of mucous membranes and, that it may be superior for this purpose, and especially for use in the eye, to other synthetic anesthetics, for the reason that it can be used in materially lower concentrations. So far, however, the therapeutic value of butyn has not been proved by ade-

quate clinical trials. For this reason, the Council postponed the acceptance of the drug for New and Nonofficial Remedies and published a preliminary report on butyn for the information of those who wish to put butyn to clinical trial (Jour. A. M. A., Dec. 10, 1921, p. 1891).

Intravenous Specialties of the Intravenous Products Company of America.—This firm's list of specialties bears a striking resemblance to those of other "intravenous specialty" firms. Its Endoarsen, like Venarsen of the Intravenous Products Company of Denver, is stated to contain a cacodylate ("dimethylarsenate") together with mercury and iodid. Venarsen was reported on unfavorably by the Council on Pharmacy Chemistry, in 1915. The inferior efficacy of sodium cacodylate and its worthlessness as a spirocheticide have been demonstrated. Like other "intravenous" firms, this company advertises the intravenous administration of drugs such as sodium iodid and hexamethylenamin. The objections to and the dangers of indiscriminate administration of drugs intravenously was recently emphasized in a report of the Council on Pharmacy and Chemistry on "Some of Loeser's Intravenous Solutions" (Jour. A. M. A., Dec. 10, 1921, p. 1912).

"The Alsaker Way."—R. L. Alsaker advertises a series of "Books That Teach The Alsaker Way to Health and Efficiency." Rasmus Larrsen Alsaker was graduated by Bennett Medical College, Chicago, in 1910. Alsaker's book "Curing Diseases of Heart and Arteries" seems to be the book that is pushed at present. The first part of this book contains certain elementary facts of physiology and hygiene that could be found in the ordinary common school textbooks on such subjects. The therapeutic phases of the subject are so treated that the average reader might well reach the conclusion that all physicians, except Alsaker, are either fools or rogues, and that from Alsaker alone flows the only pure, unadulterated, 100 per cent medical knowledge. Alsaker's book may be counted on to have a very definite effect on the person who accepts its teachings. It may lead any patient, who because of an impaired circulatory system is under the care of a physician, to abandon such rational means as the physician might recommend and attempt self-treatment (Jour. A. M. A., Dec. 10, 1921, p. 1909).

Cod Liver Oil in Rickets.—While there is a growing belief that cod liver oil is of distinct therapeutic value in rickets, many of the experiments along this line are not sufficiently objective to be entirely convincing. Now, however, Park and Howland have furnished the direct ocular proof of the effects of cod liver oil on rickets which roentgenograms afford. The results in many cases have been so consistent that they feel justified in stating definitely that cod liver oil brings about a change in the bone which, if the diet is not too faulty, amounts to complete cure (Jour. A. M. A., Dec. 31, 1921, p. 2122).

PROGRESS

Abstracts to be submitted to Section Supervisors.

MEDICINE

SUPERVISORS:

F. J. HIRSCHBOECK,
DULUTH CLINIC, DULUTH

THOMAS A. PEPPARD
LA SALLE BLDG., MINNEAPOLIS

Abstracts from recent Medical and Public Health Papers, by Division Venereal Diseases, U. S. Public Health Service.

VENEREAL DISEASE AND MENTAL DEFICIENCY, (In England). (Editorial, Public Health Administration, Municipal Engineering and the Sanitary Record, London, July 28, 1921.) "In Staffordshire, Dr. A. G. Wilkins has investigated nearly 600 cases of mental deficiency. It must not be forgotten, he urges in his annual report 'that the number of mental defectives is likely to increase owing to the spread of venereal disease throughout the country. This national calamity is shown by the sudden rise in infant mortality attributed to syphilis in 1917 and the greatly increased number of notifications of gonorrheal ophthalmia in 1919 as compared with 1918. Our medical staff have made some preliminary inquiries into the relation between mental deficiency and venereal disease, and find no reason to doubt the essential accuracy of Dr. Mott's statement that there is some relationship and that as much as 8 per cent of mental defectives give a positive Wassermann reaction.'

"We are informed that Dr. Edith M. Guest has examined the records of 41,719 Staffordshire children of age group 12-13, and found that of a group of 44 diagnosed as syphilitic 4.5 per cent were also mentally defective, whereas of the remainder only 0.4 per cent.

"Further evidence is given by Capt. A. F. Wright, Venereal Disease Officer to the Staffordshire County Council, who examined the blood of 50 mentally defective school children in Sedgley and Willenhall, and reported that 36 per cent showed traces of syphilis, half of which had been diagnosed as 'word blind,' while 25 per cent were certainly syphilitic."

CASES OF STILL-BIRTH, (in Glasgow). (Notes and Comments, The Medical Officer, London, July 2, 1921.) In the Glasgow health report of the years 1914-1919, Dr. A. K. Chalmers, M. O. H., includes the results of an inquiry extending from 1917 to 1920 into the causes of still-birth as shown by the examination of the foetus at the municipal laboratories. The work has been carried on under the supervision of Dr. R. M. Buchanan. . . .

The apparent age of the foetuses examined varied from 4 months to 9 months, rather more than half

of the 255 examined being within a fortnight of the latter age. The proportion of cases in this series in which syphilis was undoubtedly the cause of death is certainly smaller than anticipated, for the number found was only 13 out of 255, approximately 5 per cent. It should be noted, however, that the dark ground method of examination for *spirocheta pallida* was not employed in the first 49 examined; had it been so the percentage would probably have been somewhat higher, for in the remainder of the series the percentage works out at 6.5. It was also observed that the presence of syphilis could be demonstrated in a relatively large number of foetuses in the earlier miscarriages, so that had it been possible to obtain specimens at earlier dates than those included in the series the proportion might have been still further increased.

STILL-BIRTH: ITS CAUSES, PATHOLOGY AND PREVENTION. (Francis J. Browns, *British Medical Journal*, July 30, 1921.) Browns bases his report on 200 consecutive cases of still-birth and neo-natal death occurring in the Edinburgh Royal Maternity Hospital. There were altogether 35 cases of syphilis.

A REVIEW OF THE LITERATURE AND A DISCUSSION OF SILVER ARSPHENAMIN. (H. E. Michaelson and David M. Siperstein, *Arch. of Dermat. and Syph.*, Aug., 1921.) Michaelson and Siperstein review the literature, which is confined to the German. Silver arspenamin was suggested by Ehrlich, and finally elaborated by Kolle. The drug was first used clinically in March, 1918. Results of investigation by Kolle, Fabry, Galewsky, Gennerich, Hahn, and many others are given. Authors conclude, after a careful survey of the literature and as a result of a limited personal use (250 ampules), "We feel that we may safely state that silver arspenamin is an efficient spirocheticide, which has a pronounced effect on the visible lesions of syphilis." The consensus of opinion of the many observers is that in the majority of cases of fresh syphilis a positive reaction becomes negative after the first course of from six to ten injections of silver arspenamin.

There is considerable variation in the dosage. An initial dose of from 0.05 to 0.1 gm. for a person of average weight is best—with a routine dose of from 0.2 to 0.25 gm. Authors recommend technic: Dissolve the necessary dose in 10 c.c. of sterile distilled water, draw into a 20c.c. Luer syringe, make venipuncture, aspirate about 10 c.c. of blood, and reinject the entire solution slowly.

One of the distinct advantages is the absence of the odor which characterizes the other arspenamins. This odor has made it impossible, or at least impracticable, to administer arspenamin to certain patients.

There is no difficulty in determining the oxidized product. A spoiled product has a dull, muddy, gray-

ish brown appearance, instead of the rather sparkling, clear, dark brown solution.

The interval of choice is from four to seven days, and the number of doses in a course varies greatly.

The majority of observers are not in favor of using silver arspenamin and mercury simultaneously.

There is apparently no reaction due to silver arspenamin which is peculiar to that drug and has not been noticed with any of the arspenamin group, with the possible exception of argyria.

Silver arspenamin is a more complex salt than any of the other arspenamins and the physician must be on the alert for the slightest sign of intolerance.

Although the drug has been highly recommended by neurologists, nothing conclusive has been published indicating a selective action on neurosyphilis.

A NEW TREATMENT FOR SYPHILIS. (Paris Letter, *Journal A. M. A.*, July 23, 1921.) Drs. Levaditi and Sazerac of the Pasteur Institute presented a communication to the Academy of Sciences concerning the use of a new substance in the treatment of syphilis; namely, potassium sodium bismuthate. This substance is still in the experimental stage. Intravenous injections of a watery solution of this compound were made in three syphilitic rabbits. The following day no spirochetes could be found in the blood. No recurrence four months later. Prompt cure of the primary symptoms of syphilis in man has been brought about, also the disappearance of the spirochetes from the blood. But no final conclusions, the author states, can yet be drawn from these experiments for several years.

RESULTS OF CENSUS OF PERSONS AFFECTED WITH VENEREAL DISEASE. (in Germany). (Berlin Correspondent, *Journal A. M. A.*, August 27, 1921.) A preliminary official report has been published of the results of the census of persons suffering with venereal disease, which was taken in Germany during the period from November 15 to December 14, 1919. During this period 136,000 civilian and army men were under treatment for venereal disease or its sequels. In other words there were 22 venereal patients to 10,000 of population. In many large cities the average rate of 0.22 per cent was exceeded: Berlin 0.76; Hamburg 0.67; and Lubeck 0.49 per cent. However, since in the large cities there are proportionately more unmarried men from 15 to 30 years of age (the dangerous period) than elsewhere, it is not justifiable to draw from these figures the definite conclusion that there is a greater spread of the diseases in the cities. The figures for the several states of Germany are not essentially different.

A comparison of statistics recently obtained with those based on the census of 1913 does not show that venereal disease in Germany have materially increased. The incidence is most frequent in men and women in the 20-25 age group. The second most

frequent incidence occurs in both sexes in the 25-30 age group, but after this a differentiation is noticeable, since the third most frequent incidence in men is during the period from 30 to 40; in women from 15 to 20. Of the men the unmarried group is most affected; then come the divorced, next the married group, while widowers come last. With the women the relationship is different: the divorced are most affected, then come the unmarried, next the married, and widows come last.

REGISTRATION OF SYPHILITICS (in Denmark). (O. Jersild Ugeskrift for Laeger, June 2, 1921. Control of Venereal Diseases, Lancet, London, July 9, 1921.) In Denmark a system of registration has existed for about half a year. The Wassermann reaction is carried out only in one institute and under state control. The machinery for the Wassermann reaction being centralized it was comparatively easy to evolve a system of registration centering about this reaction. The Wassermann forms have been worded so as to serve the double purpose of serological report and registration. Notification is thus almost automatic; it is confidential as identification data supply the place of names.

In practice it has been found that syphilologists are apt not to make use of the test the first few years after infection. To overcome this difficulty they have been supplied with special registration forms. Although registration has existed only half a year, about 10,000 persons have already been entered on the Serum Institute's registers.

TREATMENT OF TUBERCULOSIS ADENITIS: Russel H. Boggs. (Amer. Jour. Med. Sc., Vol. 162, July 1921) strongly advocates the use of radium and roentgen ray in the treatment of tuberculous adenitis. Formerly radiotherapy was used in the treatment of unsightly scars; today this treatment is advised because more permanent cures are obtained than by any other method, especially when an early systematic raying is employed. Radiotherapy alone will cure 90 per cent of these cases. Such treatment entails no danger of spreading the disease, produces no unsightly scars, and sacrifices no tissues as does surgery. Furthermore, such treatment produces a systemic effect similar to successful tuberculin treatment with more dependable results. Other methods of treatment are apt to increase the patient's susceptibility to the disease by lowering his vitality. By raying the local infection in the gland, its hypersusceptibility is reduced which prevents spreading of the disease. The author further states his belief that the susceptibility to the development of tuberculosis is always greatly lessened after a few radiations, and that the patient, at least in some cases, is rendered immune.

Surgery should be limited to the removal of hard fibrous nodules which follow radiotherapy. These seldom ever contain any tuberculous foci, but it may

be advisable to remove them thru a small incision the same as any foreign body.

It is to be remembered that large cervical glands may be due to sarcoma, Hodgkin's disease, leukemia, etc., and that radiotherapy is still the best form of treatment for multiple glandular tumors, but the end results are not the same as when the enlargement is due to tuberculosis.

R. M. EPPARD.

SURGERY

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THE TECHNIQUE OF GALL-BLADDER SURGERY IN THE PRESENCE OF JAUNDICE: Crile (Surg., Gyn. and Ob., Volume 33, No. 5.) points out that in jaundiced patients demanding operation one prime risk is encountered, i.e., exhaustion. The liver is as necessary to the maintenance of life as the brain or the heart. Any impairment in the integrity of the liver is accompanied by a corresponding impairment of the brain cells. It follows that when an operation is required in the presence of jaundice and depression of the failing resources of the patient, that is, the remnant of the liver function, must be scrupulously preserved; and, if possible, the margin of safety increased. In these cases the internal respiration is seriously impaired. The conservation of the internal respiration of the cells depends upon oxygenation, water, and neutralization of excessive acids.

All inhalation anesthetics interfere with internal respiration. It is depressed by cooling and promoted by heat. The continuous uncontrollable fall of the temperature of the brain following excision of the liver is equalled by the fall of the temperature of the brain during surgical anesthesia under ether. Under nitrous oxid-oxygen anesthesia the fall of the temperature of the brain is but slight, and under analgesia it is negligible. Analgesia gives freedom from fear, worry, or anxiety; it mitigates the sense of pain about eighty per cent, and the balance can be covered by local anesthesia.

Crile states that as a result of experience of the recent war together with the findings of certain researches, an all important principle has been introduced into the surgery of the bad risk patient. The management and treatment is based on probability and not on the state of the patient at the moment.

The function of the liver is depressed by narcotics, especially morphine. In operating on jaundiced patients the exposure should be as slight and as brief as possible, and hot packs should be applied immediately after operation.

Blood Transfusion promotes oxygenation if the cells and saline infusion aids in maintaining the water equilibrium and the acid alkali balance. Therefore, these last two measures should be carried out either before or after operation.

In grave cases, the operation should, if possible, be divided into two distinct physiological stages. The first stage should include only such measures as are required for the relief of the biliary obstruction, wholly disregarding any manoeuvre for the removal of the stones unless they are in the way. The ultimate operation can well be delayed until the danger point is passed, and the stability of the liver cells and of the brain cells has become established.

E. MENDELSSOHN JONES.

CLINICAL AND EXPERIMENTAL OBSERVATIONS IN THE USE OF SALINE IRRIGATION IN THE TREATMENT OF DIFFUSE PERITONITIS:

A. Murat Willis (Surg. Gyn. and Ob., Oct. 1921.) points out that in recent years there has been a decided reduction of the mortality accompanying diffuse peritonitis. There are several factors that have contributed to this improvement of results, namely; Early operation, the free use of water or salt solution by rectum combined with subcutaneous injection of normal salt solution. There are other details of treatment, however, about which surgeons are not in such perfect accord.

Irrigation in peritonitis is one procedure over which there is considerable difference of opinion. The objections raised to the use of saline irrigation in the presence of diffuse peritoneal infections are the following:

- (1). It tends to produce shock by subjecting the patient to a longer operation.
- (2). It traumatizes the peritoneum and accelerates absorption.
- (3). It washes off the defensive Phagocytes and removes the protective exudate.
- (4). It spreads infectious material from the primary focus to areas of the peritoneum that had not previously been involved.

The author brings out that these objections may appear to constitute a severe indictment against the practice of peritoneal irrigation but a closer analysis reveals that the basis upon which they rest is more fancied than real.

It is true that long exposure of the intestines to the air with the resulting drying joined to the trauma of excessive handling will give rise to a condition similar to surgical shock. Prolonged etherization also will much reduce the resistance of animals to intraperitoneal infection, but these factors are by no means necessitated in employing irrigation clinically. The author does not feel that the added few minutes demanded by irrigation are more apt to cause this so-called shock than is the hasty, ill-executed operation performed in accordance with

the too literal acceptance of the dictum: "Get in quickly, get out quicker."

When one fills the cavity and covers the intestines with warm, isotonic salt solution and is careful to avoid mechanical insult to the tissues, it would seem that there is far less tendency to trauma than when the intestines are exposed to the drying influence of the air.

The exudate originally contains phagocytes and unformed defensive products but later in the disease it teems with virulent bacteria and hence removal of the greater part of the peritoneal exudate by irrigation should be very beneficial. No one advocates irrigation of the uninvolved peritoneum in the presence of a definitely walled off abscess, but it is used when dealing with a diffuse process.

In favor of the use of free irrigation with normal salt solution in appropriate case the writer states:

(1). It lessens the tendency to shock by preventing undue loss of heat through the use of a solution slightly above body temperature and also through the prevention of drying of the exposed intestines.

(2). It mechanically washes out a certain number of unabsorbed bacteria, and at the same time, fibrin, blood clots, pus or intestinal contents which may serve as foreign material, facilitating the growth of the bacteria.

(3). It serves to dilute those toxins which are not removed at the time of operation, unless removed these must be destroyed in the tissues or eliminated unchanged, and, if one be permitted to reason by analogy, dilution will markedly lessen their injurious actions.

(4). The peritoneum is an absorbing surface of great activity.

The author believes that these arguments based upon theoretical consideration do not tend to show that irrigation of the peritoneal cavity in the presence of a diffuse peritonitis is a reprehensible procedure. One should only be influenced by actual results in making a decision rather than theoretical considerations, no matter how logical the matter may seem.

The article also contains an account of some experimental work carried on by the author.

E. MENDELSSOHN JONES.

INDICATIONS FOR THE SURGICAL TREATMENT IN DIFFERENT TYPES OF GOITRE: W. E. Sistrunk, (Surg. Gyn. and Obst., Oct. 1921, Page 348).

Plummer states that there are only three types of goitre-colloid, adenomatous and exophthalmic, and that other types seen clinically are just variations or combinations of these three.

1. Colloid Goitre—is the goitre of youth, rarely seen in people of 30 or 35 years. They may possess some of the symptoms of the exophthalmic—but the basal metabolic rate is never increased. The Goetsch test gives a marked reaction and thus leads

one astray in calling this type the exophthalmic variety. Microscopically, this type shows dilated acini filled with colloid, and the lining epithelium is low and flat in appearance. It is the only goitre disappearing under the use of iodine or thyroxine, and should not be considered surgical.

2. *Adematous Goitre*—is the most common type, originating in early life—and may be slow or rapid in its growth. Degenerative changes are prone to occur as a result of hemorrhages, and from this the various varieties such as hemorrhagic, cystic, fibrous and calcareous, receive their names. Hypothyroidism may result. Plummer stated that 23 per cent of patients with adenomas examined at the Mayo Clinic presented symptoms of hyperthyroidism, but these symptoms had not developed until the goitre had been present for an average of 16 years. This associated hyperthyroidism presented a picture different from that seen in exophthalmic goitre. The cardiovascular system suffers more in this condition while in exophthalmic goitre the nervous system is more affected. Adenomas are best treated surgically, but it is usually best to wait until the patient is 25 or 30 years of age. It is best to remove adenomas in a healthy person before toxic symptoms have developed. The operative risk in those who are toxic and show advance myocardial changes, is always greater.

3. *Exophthalmic Goitre*—may occur at any age but generally in third and fourth decades. It may develop very rapidly with severe symptoms at onset, or very slowly and not become very bad until second or sixth month, and pass through a crisis. They then may improve considerably—but are pretty apt to have a recurrence. Marked changes in vital organs may leave those who survive these crises in a state of chronic invalidism. Best results are obtained through surgery. Judgment in the selection of the type of operation for each individual case is absolutely necessary. Patients are usually extremely dangerous during the crisis, and should be treated by means of rest, fluids, and careful nursing.

Determination of basal metabolic rate is a great aid in diagnosis of early stages of exophthalmic goitre. It is a definite index at the time it is taken of the amount of hyperthyroidism but gives no indication of the amount of damage already done.

W. C. CARROLL.

CANCER OF THE BREAST: Byron H. Davis, (*Arch. of Surg.* Sept. 1921, Pages 348-356.) The author reports 190 cases of cancer of the breast of which he has been able to trace 122. Of this number, seventy-five were free from recurrence for from three to twenty-one years and forty-seven were reported as having died or as suffering from a hopeless recurrence.

No one any longer reports his cancer patients as cured—a three or five year limit is purely arbitrary.

The author has had patients remain apparently well for five, eight, ten years, and then report a recurrence from which they soon died.

The length of time the existence of the lump in the breast has been known and the apparent extent of the disease at the time of operation are not nearly such good indexes of the prognosis as one would theoretically suppose. The discovery of the lump is usually accidental, bearing no definite relationship to the date of the beginning of the disease, or to the extent of its dissemination. Some of the patients with apparently mammary and axillary involvement have been free from recurrence for many years while several patients with only a small lump in the breast, recently discovered, with no apparent extension to the axillary or other glands, have died of early and rapid carcinoma. The author reports two illustrative cases and states that there are degrees of malignancy of carcinoma of the breast.

Local recurrence should not be considered the sounding of the death knell. Several of the author's patients have been operated upon for a first, second and even third recurrence and are still alive and apparently free from disease up to ten years after the last recurrence.

When one can make a positive preoperative diagnosis of cancer, it is too late for the best average results. The ideal operation for mammary carcinoma is the one that starts in as an exploratory incision.

The author believes that the most usual precancerous lesions recognizable in the breast are benign tumors and chronic mastitis and urges the removal of all benign breast tumors and the amputation of breasts that are the seat of chronic mastitis.

The most important lymphatic highway leads from the breast to the axillary glands. Invasion of the axillary glands is usually the first point of attack outside of the breast and pectoral fascia. Occasionally, the lungs, the liver and other organs are invaded first and, in rare instances, the patient may die without the axillary glands having been involved.

Cancer cells may reach the mediastinum, the lungs or the pleura by growing along the lymphatics that accompany the perforating branches of the internal mammary artery. About 50 per cent of late cancer cases show invasion of the thoracic cavity.

The author had eight cases which later developed cancer in the opposite breast. Invasion of the peritoneal cavity and liver occurs in the course of this disease. Invasion of the liver has been found in 36.6 per cent of the cases.

The author believes that intensive postoperative x-ray therapy increases the prospects of permanent relief.

Occasional cases are encountered in which it is better not to operate. Those mentioned are: 1. Deep involvement of chest wall; 2. Firm fixation of the tissues to the chest wall; 3. Fixation of the axillary mass; 4. Very extensive skin involvement; 5.

Enlarged and fixed supraclavicular glands; 6. Secondary growths on the lungs, liver or other viscera; 7. Bone metastasis.

The author believes the time is coming when 70 or 80 per cent of patients with carcinoma of the breast may be permanently relieved.

FRED R. SANDERSON.

ROENOLENTGOGY

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TUMORS OF NERVE TISSUE IN RELATION TO RADIATION. James Ewing. (Amer. Jour. of Roent., 1921, Vol. VIII, No. 9, Page 497.) Structural characters which determine susceptibility to radiation are: (a) Cellular character; (b) undifferentiated form of cells; (c) rapid growth with abundance of mitosis; (d) vascularity, especially if delicate capillaries; (e) absence of much intercellular substance.

There is a wide variation in the above particulars in the tumors that affect nerve tissue, and from their structural characteristics one would expect the following reactions to radiation: (a) Neuro-fibroma—exceedingly resistant; (b) psammoma—mildly inhibitory unless radium can be applied directly; (c) endothelioma—as a whole rather unfavorable unless of vascular or cellular type; (d) angio-sarcoma—ought to be markedly influenced by radiation and very difficult surgical removals; (e) glioma—ought to yield readily to moderate radiation; (f) primary carcinoma—deeply situated and well protected but their delicate structure would indicate favorable results; (g) hypophysical tumors—promlematic but the clinical symptoms are delicate indicators of any therapeutic effect and under this field of unusual interest.

The application of radium to intracranial or intraspinal tumors is not unattended by difficulties and dangers. The adult skull and brain will absorb ten per cent of gamma rays passing through 2 m.m. of brass. So to treat centrally placed tumors an increase in dosage, distance, and time must be provided and the quantity of radium necessary restricts this therapy to institutions possessing a large amount.

The damage to normal brain tissue is not such a grave problem as actual caustic necrosis of the scalp may accomplish without structural changes in the normal brain. A more important danger is the increased intracranial pressure that results from the radiation in a brain which is already suffering from the effects of increased intracranial pressure. Therefore, unless the patient can stand a temporary increase in pressure, the application of radium may be followed by aggravated symptoms.

If the tumor can be exposed, the most effective method is the direct insertion of radium into the tumor. No surgical removal of a part of the tumor should be attempted as the mass serves as a protection to surrounding normal tissue. Surgery increases the possibilities of infection and tissues exposed to radiation are more susceptible to infection.

In closing, the author states that the problem is one of clinical research, and warns against it being undertaken by anyone except the experienced neurological surgeon and radium expert. The only safe guide is experience.

A. U. DESJARDINS.

SOME REMARKS ON THE PRESENT STATUS OF X-RAY THERAPEUTICS. Geo. W. Holmes. (Amer. Jour. of Roent., 1921, Vol. VIII, No. 9, Page 522.) Doctor Holmes read this paper before the New York Roentgen Ray Society on the 25th anniversary of the discovery of x-rays. He stated that the radio-therapist had failed to keep step with the physicist and the biologist.

I. Method of Determining the Amount of Radiation.

The indirect method, of determining the amount of radiation coming from the tube by measuring the amount of electrical energy supplied to the tube, is most used in America. It is more accurate than the old direct method and the ionization chamber method has not yet come into fair trial.

II. Method for Determining the Quality of Radiation and the Selection of Different Qualities for Different Diseases and Conditions.

Present tendency is to place more emphasis on quantity and to use rays of a shorter and shorter wave length. However, still some place for unfiltered rays. Tendency is to increase the target-skin distance and this is decidedly advantageous.

III. Effect of Radiation upon Normal and Pathological Tissue.

The author quotes Doctor R. B. Greenough's summary:

- (1) Living tissue may be destroyed en masse.
- (2) Growth may be temporarily inhibited.
- (3) Rapidity of growth may be stimulated.
- (4) Manner of growth may be modified.

Holmes remarks that when it is not possible to destroy deep seated disease, radiation should be sufficiently frequent to maintain its inhibitory powers.

IV. The Effect of Treatment Upon the Individual as a Whole and His Re-Action to it.

The exact cause of treatment-sickness is not known but probably is due to several causes, the most active being some obscure change in the blood. Another general effect is an increase of metabolism and an improvement in the general well-being of the patient.

In handling a patient with malignancy, complete surgical removal should be done if there is no metastasis. In the latter event, there is a choice be-

tween a radical attempt at destruction of the malignant cells without regard to the patient's comfort or merely to attempt to inhibit the growth and confining the dose below that which would cause a painful erythema. The latter procedure is the more rational.

Surgery breaks down the natural resistance and interferes with the walling-off process which is the result of connective tissue stimulation.

Today there is need of better coöperation with the internist and surgeon.

A. U. DESJARDINS.

GYNECOLOGY AND OBSTETRICS

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PERFORATING HEMORRHAGIC (CHOCOLATE) CYSTS OF THE OVARY.

John A. Sampson. (Arch. of Surg., Vol. 3, No. 2.) The author calls attention to a peculiar type of hemorrhagic ovarian cyst which is important from two standpoints: (1) Frequency and (2), the nature of the adhesions resulting from the escape of its contents. These cysts may be bilateral, usually from 2 to 4 cm. in diameter and develop in women during menstrual life, 30 years to menopause. The contents escape and give rise to dense adhesions in the culdesac or to adjacent structures, suggesting an inflammatory reaction. Sampson has found tissue of the endometrial type lining the wall of these hematomas and also in the structures which are involved in the adhesions which may be: the broad ligament, fallopian tube, vesicouterine fold, culdesac, post wall of the uterus, supravaginal portion of the cervix and rectovaginal septum. Such endometrial tissue becomes a menstruating organ, and is filled with blood which may escape or extend in the tissues and allow implantation or extension of the adenomyoma.

It is impossible to review this exhaustive study in any detail. Dr. Sampson presents a most fascinating explanation of the relation between these hemorrhagic cysts and pelvic adenomata of the endometrial type. Detailed pathologic studies of twenty-three cases together with excellent illustrations are presented, demonstrating pathological changes resembling that of the various common examples of adeno-myoma.

Sampson quotes Novak's classification of ovarian hematomas: (1) follicular including, Graafian Follicle and atretic follicles. (2) Corpus luteum, and (3) Stromal. A fourth variety or hematoma is added, namely one which is lined wholly or in part by "endometrial" tissue, and the author quotes several examples from the literature, besides his own which are described in detail. Endometrium correspond-

ing to that found in extopic edenomyomata can be demonstrated in his specimens. The author presents several possible explanations of the origin of such endometrium but does not care to make a definite statement at present. Twenty-six such cysts are arranged into three groups: (1) Showing retrogressing corpus luteum membrane, with areas near the perforation which are lined by epithelium, low, cuboidal, or columnar, resting a vascular, cellular stroma, often with glands. These suggest either development of an endometrial cyst from invasion of a follicular hematoma by misplaced endometrial epithelium, or else the regeneration of the epithelial lining of an endometrial cyst associated with menstrual hemorrhage. (2) Possibly a different stage of the preceding, with lining of epithelium resting on narrow layer of stroma. (3) Wall is composed largely of ovarian tissue but in places, especially about the perforation, one can demonstrate endometrium. Various phases of the menstrual cycle can be demonstrated in such cysts. The process of repair is not as rapid as in the uterus and the repeated hemorrhages may eventually destroy the cyst. Such "menstrual" blood escaping allows the extension or implantation of the epithelial tissue and gives rise to other foci of endometrium.

The adhesions which develop about such perforations with hemorrhage were always regarded as being the result of infection or irritation. This was formerly the belief of the author and his interest in this type of cyst was confined to the view that these were misplaced endo-metrial hematomas and that the adhesions were due to the irritating influence of menstrual blood. Associated adenomyomata were regarded as examples of multiple foci of misplaced endometrium. During the past year all tissue which was involved in such adhesions was studied microscopically, of 23 such cysts, pelvic adenomata of the endometrial type was found in 13. These are grouped as follows: (1) Adhesions obliterating the culdesac with adenoma of the endometrial type invading the cervix and rectum. The author is convinced that the ovary is the primary site of such growths. (2) Adhesions between the rectum and uterus with invasion of the posterior surface of the uterus with such adenomata. (3) Adhesions in normal peritoneal folds and development of adenomata on the uterosacral, broad ligaments, round ligaments, or in the utero-vesicle fold. (4) Discrete nodules of adenoma in the wall of the rectum or sigmoid.

In considering the origin of adenomyoma of the uterus, there are two possible sources. (1) From within by an invasion of the uterine wall by the mucous lining. (2) From without as herewith described.

Clinically these cysts and sequelae occur between 30 and the menopause. Pain when present is most marked during menstruation. The cysts are small and often adherent, may simulate a malignant ovarian cyst.

Treatment. It is possible that the menopause may limit the growth of such adenomata but this is not determined. The primary ovarian cyst should always be removed. The author follows the lines of conservatism in surgical removal of involved tissues.

ARCHIBALD L. McDONALD.

PEDIATRICS

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EXPERIENCE IN MORE THAN ONE HUNDRED CASES OF EPIDEMIC ENCEPHALITIS IN CHILDREN: Josephine B. Neal. (Arch. of Ped., Aug. 1921.) The author gives a brief resume of the literature on this subject. She states that in a series of cases there were 50 per cent more males than females. The seasonal distribution showed the maximal number of cases in the first quarter of the year. In only one instance in this series there were two cases in the same family, and these two became ill on the same day. The mortality of the cases over 15 years was 27 per cent. The most prominent symptoms were fever, vomiting, headache, malaise and those referable to the nervous system. Some of the patients were drowsy and some delirious. In some instances there were ocular disturbances, diplopia, blurring of the vision, strabismus nystagmus, convulsive movements of the eyeball, etc. The cranial nerves were most often effected. Kernig's sign was not common unless associated with spasticity. Pneumonia was the most dangerous complication. The spinal fluid findings were precisely the same as those in poliomyelitis. The cell counts were between 100 and 150. There was a slight increase in albumin globulin, and the sugar content. The most common conditions from which encephalitis lethargica must be differentiated were tuberculous meningitis, brain abscess, brain tumor and poliomyelitis of the encephalitic type. The most common sequelae were weakness and paralysis. Changes in speech and mentality were observed in 3 adults and in 10 children.

R. N. ANDREWS.

BODY FATIGUE IN MALNUTRITION OF CHILDREN: Borden S. Veeder. (Arch. of Ped., Aug., 1921.) The author states that for a number of years he has taken considerable interest in group of underweight and thin children with no striking pathological condition, most of them coming from homes of good economic circumstances so that lack of proper food seemed not to be the cause of the malnutrition. He felt that in some instances bad posture was the cause of the gastrointestinal disturbances presented. He was inclined to attribute the

condition to heredity, but found that this did not seem to furnish any satisfactory explanation. After observing two or three cases in the home he came to the conclusion that the basis of the condition lay in fatigue, and treatment based on that theory gave prompt results. If one watched these children it was found that they became tired in their play, and forgot to relax. The causes of the fatigue might be multiple; such as bad posture, over work, over play, or over study; too many parties, too many movies, too much excitement and too little rest and relaxation might explain the condition of these children who were simply underweight and under par and in whom there was no definite pathologic condition. The removal of physical defects was not the entire solution of the problem; one must study the environment and among other things see that the proper amount of sleep was obtained. The necessary sleep required is as follows: A child of 1 to 2 years required 13 hours sleep in 24 hours; 2 to 4 years of age required 12 hours; from 4 to 6, 11 hours; from 6 to 10, 10 hours, and from 10 to 14, 9 hours. Let it be understood that this is the minimum and some individuals require more.

In closing the author again emphasizes the importance of rest and relaxation in relation to the general health of the child and the problems of malnutrition. These he considered were needed as much as proper clothing, bathing, care of the teeth and proper diet.

R. N. ANDREWS.

ABDOMINAL SURGERY IN INFANCY FROM THE PEDIATRIC VIEWPOINT: F. C. Rodda. (Jour. Lanc., Sept. 1921.) Surgery in the infant presents some very especial problems which must be appreciated to obtain the best results. In the infant we are dealing, not only with a smaller organism, but also with one presenting peculiarities.

1. The infant's body differs from the adult's anatomically, histologically, and even chemically.
2. It is more susceptible to extreme metabolic disturbances.
3. It is a more unstable organism than the adult.
4. It possesses little resistance, and practically no immunity.

In the diagnosis of these disorders in the infant subtle difficulties are encountered. Reliable subjective symptoms are not obtainable. There is complete lack of co-operation on the part of the patient with consequent difficulty in interpreting the physical findings. Pain in the infant manifested by crying, doubling up the extremities, and unusual postures may betoken pneumonia, gas pains, pleurisy, earache, hunger, appendicitis, mechanical irritation, or pyelitis. A suspected localization may prove misleading. A distended or hyperesthetic abdomen may be found in all of these conditions. No abdominal surgery should be undertaken until a complete physical examination has been made. This should include inspection of throat and ears, care-

ful percussion and auscultation of the chest, and a microscopical study of the urine.

The surgical care of the infant is very important. We have long known that from lack of food and water, or as a result of vomiting, purging, and diarrhea, a child will lose rapidly in weight. This has been shown to be due primarily to a loss of body fluids, and often at the end, result in a state of acidosis. In the light of these considerations pre-operative starvation and catharsis might prove disastrous. Fluids in the form of normal saline or glucose solution should be given freely before operation. Further post-operative starvation and withholding of fluids is a serious handicap.

The adult has an admirable heat control, but in the child the reverse is true. Chilling is conducive to shock. The operating room should be very warm, the infant surrounded with hot water bottles, and exposed as little as possible. In addition the shorter the operating time the less anesthetic is required, and this is not a negligible factor.

Loss of blood is of grave importance to the infant. It produces shock, increases dehydration, debilitates the infant, and reduces its immunity.

Finally these babies should be isolated as they possess practically no immunity to infection. They should be placed in a room where the best isolation is obtainable and the best aseptic nursing practiced.

R. N. ANDREWS.

BOOK REVIEWS

PATHOGENIC MICRO-ORGANISMS—McNeal—second edition. P. Blakiston's Son & Company, Publishers. \$4.00.

This book presents the subject of bacteriology in a most entertaining, as well as comprehensive, manner, and will be more appreciated by the practising physician or general laboratory worker than by the highly specialized technical bacteriologist. This is due to the fact that instead of a detailed discussion of the characteristics of the various bacteria, they are treated in a more abstract manner with special reference to allied subjects such as public health or pathology. In this edition the subject has been brought up to date with references to the recent literature.

The introduction differs from the usual one in that special attention is given to the bearing on hygiene, pathology, and agriculture. The first chapters, dealing with the use of the microscope and the simple

principles of bacteriological technique, seem unnecessarily detailed when compared to the broader, more general treatment of the other subjects. Of especial interest are the somewhat unusual chapters on "Parasitism and Pathogenesis," "Pathogenic Property of Micro-organisms," and "Reaction of the Host to Infection," as well as the following brief but comprehensive chapter on immunity.

The molds and yeast and the diseases caused by them are exceptionally well done and definitely clarify a somewhat confusing subject.

Of special value is the broad yet comprehensive treatment on diphtheria, tuberculosis, and syphilis, in which their respective pathology and immunity are given a very definite place. Other chapters of interest are those on "Filterable Microbes," "Mastigophora," and "Sporozoa" in which the most recent investigations of these subjects are given. For every person interested in the science of medicine this book will not only prove to be interesting but will also leave a very clear and modern conception of the nature, action, and effects upon human life of the pathogenic micro-organisms.

MARGARET WARWICK.

OBSTETRIC PRACTICE. Berkeley & Bonney (P. Blakiston's Son & Co., \$11.00).

On the cover of the book we find the above title. On the first page of the volume, however, we find "The Difficulties and Emergencies of Obstetric Practice." The latter title is more in keeping with the reading matter of the book.

Having dealt with the difficulties in the diagnosis of pregnancy, the author takes up the disorders of the various organs and systems which may manifest themselves during pregnancy, such as the intestinal tract, urinary tract, the vascular system, etc.; the infectious fevers, the specific infections; tumors and displacements; hemorrhages at different times of pregnancy; the various complications of labor from whatever cause, etc., the complications of the puerperium and then devotes a chapter to the diseases and injuries of the newborn and a chapter to feeding.

Furthermore, the subdivisions of the subjects, such as etiology, diagnosis, symptoms, treatment, etc., are all indicated in bold type so that the reader need waste no time in finding what he wants. The text is brief and to the point, no time or space is taken up with embryology and theory. A short paragraph, some times a few lines and often a single line contains all the author has to say. This is a good book.

ALBERT G. SCHULZE.

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ORIGINAL ARTICLES

ANAPHYLAXIS* TO FOOD PROTEINS IN BREAST FED INFANTS AND ITS PROBABLE RELATION TO CERTAIN DISEASES OF THE NURSING INFANT, ESPECIALLY EXUDATIVE DIATHESIS†

W. RAY SHANNON, M.D. M.S.
St. Paul, Minn.

Current opinion holds that the nursing mother may eat whatever she desires without fear of causing disturbance in the baby. Recent researches have overthrown this contention¹. It has been proven that egg protein may appear in the breast milk after ingestion by the nursing mother in even moderate quantity, and that it may give rise to allergic phenomena in the infant. The conclusion was drawn, as a result of this work, that it was reasonable to assume that the same might be true of any food that the mother might eat. It is the purpose of this paper to discuss the validity of this contention, and to consider some of the clinical problems arising as a result.

Anaphylaxis is a phenomenon occurring within the animal body, or under certain conditions in the excised parts, upon the introduction of a foreign protein after the animal has become sensitized to that protein. Sensitization may be inherited, passively acquired or actively attained. The latter form results within a variable period of time, usually from eight to ten days at least after the protein substance has been introduced parenterally into the body. Either the sensitizing or subsequent shock dose

may be introduced by subcutaneous, intravenous or intraperitoneal injection, by absorption of undigested protein from the intestinal mucosa, or probably by absorption through any of the mucous membranes of the body.

The symptomatology varies greatly in the types of animals. Clinically the condition has been studied extensively in man. The symptoms of anaphylaxis in man are very varied. There may occur sudden severe shock, sometimes ending fatally, as upon the injection of horse serum into sensitized individuals. There may be the severe dyspnea due to spasm of the bronchioles giving rise to the asthmatic attack, studied so extensively by Walker. Irritation of the upper respiratory membranes as seen in hay fever, may be the main picture. In infants, especially, there may occur repeated respiratory infections, usually with cough. Various types of gastrointestinal symptoms may occur, as vomiting, severe colic or diarrhea. There may or may not be fever or the temperature may be subnormal. Lastly, there may be the various types of skin manifestations such as erythemas, urticarias and eczemas. These pictures may occur singly or in combination, as a result of the introduction parenterally into the body of some protein substance to which the individual has become sensitized.

Sensitivity in man is determined by the use of the cutaneous reactions. The old intracutaneous method of application has been almost universally discarded as too laborious and difficult of interpretation. The technic as described by Walker is that in most general use at the present time. He describes this as follows: "A number of small cuts, each about an eighth of an inch long, are made on the flexor surface of the forearm. These cuts are made with a sharp scalpel, but are not deep enough to draw blood, although they do penetrate the skin. On each cut is placed a protein and to

†Presented before the Minnesota State Medical Association, Duluth, Minn., August 1921

*There is difference of opinion in the literature as to the relation of anaphylaxis and allergy. In this paper the terms will be used synonymously.

it is added a drop of tenth normal sodium hydroxide solution to dissolve the protein and permit of its rapid absorption. At the end of a half hour the proteins are washed off and the reactions are noted, always comparing the inoculated cuts with the normal controls on which no protein was placed." In infants it is more practical to use the back than the forearm, especially if a large number of proteins are to be tested. Then too, it is not necessary to wait the full half hour before reading the tests. From ten to twenty minutes is sufficient.

The interpretation of the positive reaction permits of some discussion. Walker² requires an urticarial wheal .5 cm. in diameter for positive interpretation. The majority of men working on children have accepted this standard. According to my experience this standard is not suitable to infants. Much more frequently than a wheal one gets only an erythema. I am convinced that it is the failure to recognize this point that has led to much confusion and dissatisfaction concerning the cutaneous protein tests in infancy. Such a standard complicates greatly the interpretations it is true, because there are apt to be varying degrees of redness around the different tests and sometimes the controls will show erythema of varying degree. Nevertheless a definite erythema in the absence of a similar reaction in the control should be regarded as positive and the lesser reactions should be kept in mind. They indicate that the protein concerned may be a possible factor in the disturbance noted in the patient.

At a previous time I have said that it is reasonable to suppose that almost any food that the nursing mother eats may appear in the breast milk and cause disturbance in the infant. Since that paper was written I have shown that veal protein was present in the breast milk of two women after its ingestion. There is abundant evidence that other foods as well may appear. Talbot³ relates the case of an eczema in a breast fed infant which cleared up upon the mother's omitting chocolate from her diet and which reappeared when she again ate that food. O'Keefe⁴ obtained in nursing infants positive skin tests to cow's milk casein, oat, cod-fish, in addition to egg. In some of

his cases improvement occurred upon removal of the offending protein from the mother's dietary while in others it did not.

During the past few months I have had the opportunity of studying the skin reactions to food proteins in fourteen cases that were regarded as probable food disturbances. These cases were either exclusively breast fed or essentially so. Altogether in the entire series forty different food proteins were tried. Of this number twenty-seven foods gave positive reactions in one or more cases. Nine of these foods gave a wheal at the site of inoculation in one or more cases. Seven other foods gave questionable reactions in one or more cases. This leaves only six foods which did not give possible evidence of sensitization in one or more of the fourteen cases studied.

Altogether 254 tests were done on the fourteen patients. Eighty of this number gave a positive result. Of these 80 positive tests 69 were in response to foods that the infants had never eaten. Out of the 80 positive tests 14 showed wheals, and of the 14 wheals 10 were to foods that the infants had never eaten.

O'Keefe noted that none of the mothers of the ten breast-fed infants that he tested were sensitive to the foods to which the infants reacted. I have tested the mother in five of my cases and obtained a similar result.

It is highly improbable that sensitization could have been inherited in these babies when the mothers did not react to skin tests and when they are not conscious of any discomfort upon eating these foods. This being true we must assume that sensitization is actively attained and that it could have come about only as a result of the ingestion of the foods through the breast milk. Experimental evidence is entirely against inherited sensitization through the father.

The clinical application is indeed wide-spread in dealing with diseases of nursing infants. We must admit, if we admit that foods the mother eats may appear in the breast milk, that all of the conditions to which the older child or adult is susceptible as a result of food sensitization, may be produced in the nursing infant through the breast milk. Walker mentions the fact and Talbot⁵ has shown that repeated colds or at-

tacks of bronchitis may be due to food sensitization in artificially fed children. The true asthmatic attack is rare in infancy and is replaced by repeated bronchitis or croupy attacks. There are none of us who have not seen the severe intestinal upsets that have occurred in children as a result of the ingestion of foods to which the child was sensitized. Lastly, the various skin manifestations, erythemas, urticarias and eczemas have been proven too many times to be a result of food sensitization for us to deny the possibility of such an etiology. All of these pictures appear repeatedly in breast fed infants. In fact the cases showing these symptoms have been placed in a class by themselves, originally by Czerny⁶ and have been described as exhibiting "exudative diathesis."

It is not easy to get cases illustrative of the individual conditions mentioned, without the other symptoms also being present. However, I have been able to pick out of my series the following cases in which the various symptoms predominated.

Case 1. An infant four and one-half months old had been nursed entirely for two months. From that time it had received milk mixtures in increasing amounts until one week before it came to my office, when it had been taken from the breast entirely. During the entire time it had a great deal of colic, with gas and curdy stools, and had cried almost constantly. Especially while on the breast it had vomited persistently. There had been constant head colds, cough, obstructive breathing and a rattle in the throat during the entire time. There had been no skin eruption. The cutaneous reaction gave erythemas to egg and milk. There being still considerable milk in the breasts the mother was taken off eggs and the infant placed back at the breast. A complimentary feeding of one-half milk mixture well boiled, was given and this was gradually decreased as time went on. Vomiting and colic ceased at once and upper respiratory infection entirely disappeared within a period of a few weeks. Later it has been necessary to again increase the amount of complimentary milk mixture and the obstructive breathing has reappeared to a mild degree. The infant still takes the breast milk without any disturbance however, and is thriving.

Case 2. A breast-fed baby in whom the feeding had been supervised throughout, had begun to have a great deal of colic, with curdy, frequent stools and constant crying after a few weeks of apparently normal existence. Analysis of the breast milk had shown 6.5 per cent fat for the twenty-four hours. It

was found that the mother ate one egg every morning for breakfast. A sample of breast milk was analyzed by anaphylactic tests and egg protein found. The mother was taken off eggs and foods containing eggs, with the result that improvement began within two days of this time and inside of a week the infant was normal, except that there were still a few small curds in the stools. No attempt was made to reduce the amount of fat in the diet.

Case 3. A five and one-half month old breast-fed baby had had considerable colic for a month after birth, accompanied by a blotchy appearance of the skin and repeated head colds, with constant nasal obstruction and mucus in the throat. Symptoms had disappeared after two months, except that the stools had always contained more or less curd. Suddenly of late the colic had returned, with large curds in the stools, considerable gaseous distention of the abdomen and constant crying. Upon testing the baby with the foods that the mother was eating marked erythema was obtained to beef and lesser reactions to peas, egg white and veal. The mother was taken off the foods mentioned. For three days the baby continued to be fussy, but since that time all signs of colic have been absent. Even the stools, which have always been curdy, have become normal.

Case 4. An over-fed nursing baby three weeks old had been having a great deal of colic, with curdy stools, gaseous distention of the abdomen, and constant crying. Regulation of feeding to the theoretically normal amount did not cure the condition. The baby was tested with the foods that the mother was eating and erythemas obtained to veal, egg white, whole egg and beef. The mother was taken off these foods. The symptoms have entirely disappeared except for small occasional curds in the stools.

Case 5. A four months old nursing baby had been treated for a few weeks for a typical scaling eczema. The baby had gotten worse. It was then tested with the foods that the mother was eating. Erythematous reactions were obtained to egg yolk, potato, rye, carrot, rice, corn and veal. Egg white gave an erythema and wheal. The mother was taken off these foods. Improvement was very rapid so that in three weeks the skin was almost entirely clear. For a short time after that a trace of the eczema would come and go. For a considerable time past the skin has been perfectly clear.

Case 6. A six weeks old nursing infant had had colic ever since coming home from the hospital at about two weeks. There had been a slight rash on and off on the forehead. There was a definite seborrhea on the scalp and there were milk crusts on the cheeks. The condition improved somewhat under ordinary measures but the stools were still slimy and seborrhea still marked on the scalp. Empirically the mother was taken off eggs. When the mother returned two weeks later the baby was normal and has remained so since.

The preceding cases have been simple. I wish to mention several of the more complex cases in which the sensitization has been widespread.

Case 7. A three month breast fed baby had a severe weeping eczema over the face and a papular scaling eczema over the head. He was tested with the foods the mother was eating and erythematous reactions obtained to egg-yolk, casein, grapefruit, lactalbumin, strawberry, carrot, egg-white, corn, rice, peas, veal, asparagus, chicken and potato. Those foods to which the reaction was most marked were stricken from the diet of the mother. The other foods were limited in quantity as much as was considered safe for the preservation of a sufficiently well balanced diet. The eczema was worse for a period of two weeks, when the child was placed in the hospital in order to control the scratching. In two days there was very marked improvement. Two weeks later the eczema had cleared up entirely except for a slight palpable roughness over the cheeks. When later seen (six weeks after the first visit) the patient's skin was as smooth as any baby's.

Case 8. A baby seven and one-half months old had more or less eczema since two months old. It had gradually spread until when first seen there was a scaly, itchy eruption over the entire face and scalp, with a papular eruption over the forearms. Besides breast milk the infant had received wheat cereal, milk, carrots and soda crackers. Erythematous reactions were obtained to lima beans, beef, banana, salmon, mackerel, potato, pork and questionably eggs and rice. Carrots gave both an erythema and wheal. Those foods that gave the strongest reactions were removed from the diet of mother and patient. The others were limited as much as possible. There was a rapid and marked improvement of the eczema, but there still remained a slight scaliness of the left cheek and temple six weeks later. At this time the baby began to break out in another attack. This was concomitant with the cutting of two teeth. Tested again, erythematous reactions were obtained to wheat, which had previously been negative, and spinach which had not been tested before. These foods were removed from baby's and mother's diet. When seen one week after the last tests were performed there had again been marked improvement. Four weeks later the skin was as smooth as any baby's.

Exudative diathesis has been described as a congenital constitutional anomaly which manifests itself by certain symptoms. Czerny described as the typical lesions, the geographic tongue, the seborrhea on the scalp and milk crusts on the cheeks, which tend to give rise to eczema, prurigo (or a chronic urticaria), repeated respiratory infection and phlyctenular

disease of the eye. The geographic tongue and the phlyctenular disease of the eye have been largely disputed. However, it is quite generally conceded that repeated respiratory infections, seborrhea, milk crusts, urticaria, and the various types of eczema are definite manifestations of exudative diathesis. To this should be added gastroenteritis in the form of colic, vomiting, diarrhea and gaseous distention of the abdomen.

I have already pointed out that urticarias, eczemas, repeated respiratory infections, vomiting, colic, diarrhea and the various other gastrointestinal disturbances, have been proven to be due to food sensitization in older children and adults. Why then should such an etiology be denied for the same group of symptoms in breast fed infants? It cannot be denied if we recognize that foods the mother eats may appear in her breast milk.

Among the cases presented, several of the fundamental symptoms of exudative diathesis are shown. *Case 1* showed as the outstanding complaint vomiting, colic, diarrhea, constant head colds and bronchitis while on the breast. This ceased entirely when egg was stricken from the mother's diet.

Case 2 had colic. Egg was found in the breast milk. It was removed from the diet of the mother and the colic ceased. This occurred in spite of the fact that there was 6.5 per cent of fat in the breast milk, which Czerny says is the responsible factor in many of these cases.

Case 3 complained of colic but had had skin and respiratory manifestations. She was found to be sensitive to several foods the mother was eating. They were removed from the diet and the colic cleared up in three days and has not returned. Even the curdy stools which had always been present disappeared.

Case 4 had a similar complaint and cleared up under specific therapy.

Case 5 was an eczema which had become worse under the ordinary methods of treatment. Removal of the offending proteins from the mother's diet practically cured the disease in three weeks, using the same local treatment.

Case 6 showed a milk crust and seborrhea in addition to colic. Empirical removal of eggs from the diet, because of the fact that the

mother was eating eggs daily, caused a complete disappearance of the symptoms in less than two weeks' time.

The handling of the preceding cases has been simple. Results were prompt and definite. It will be noticed that the number of foods to which the infants were sensitive was small. The more severe eczemas are often sensitive to a very large variety of foods that the mother eats. This greatly complicates treatment and results are far less satisfactory.

Case 7 was such a case. The baby was sensitive to twelve foods which obviously could not all be stricken from the mother's diet. It was necessary to omit the foods to which the baby seemed to be most sensitive and to cut down on the others. Improvement was naturally much slower and more careful attention to the details of local treatment were necessary. Nevertheless, this case cleared completely within six weeks.

It is characteristic of eczema to break out anew from time to time and especially is it apt to be severe at times of teething. *Case 8* illustrates this. It had been sensitive to ten foods and had responded to specific treatment well. Six weeks later two teeth erupted and there was a marked exacerbation of the eczema. It was found to have become sensitive to one food that had been negative at the previous time and to another food that had not been tested before. Removal of these foods from the diet of the mother and infant caused prompt improvement again.

It is not the purpose of this paper to discuss the etiology of exudative diathesis. I mention only the fact that Czerny thought it to be due to fat intolerance and dismissed proteins as an etiological factor with the statement that they need not be discussed. This seems to be the accepted view in this country. Several writers have advanced the theory of anaphylaxis as the cause, but have apparently attracted little favorable comment⁷. I wish merely to state that most of the symptoms of exudative diathesis in nursing infants are usually, as in the cases cited, caused by allergic reactions to foods brought to the infant through the breast milk. The evanescent character of all of the symptoms, their tendency to get now better, now

worse, gives strong supportive evidence to such an opinion. The role of fat in causation of symptoms, the effect of external irritation and the influence of the hypersensitive nervous system, will all be left for discussion in their secondary role, to a future time.

CONCLUSIONS

1. Egg and veal protein may appear in the breast milk after their ingestion by nursing mothers.

2. Strong clinical evidence is offered that the same is true at times of almost any food that the mother may eat.

3. Colic, vomiting, diarrhea, repeated respiratory infections, milk crust, seborrhea and eczema in breast-fed babies, are often the result of allergic reactions to foods coming to the infant through the breast milk.

4. In the cutaneous test on infants the erythematous reaction is more common than the wheal and therefore more important.

5. Sensitization often is multiple and may be to a majority of the foods in the mother's dietary.

6. The repeated exacerbations of eczema in breast-fed babies may be due to newly acquired sensitization to foods the mother eats.

7. The manifestations of exudative diathesis in nursing infants are the result of anaphylactic reactions to food proteins in the mother's dietary, and not a result of fat intolerance, in the majority of cases.

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DISCUSSION

DR. J. T. CHRISTISON, St. Paul: Ever since Czerny gave us his idea of the exudative diathesis we, as pediatricians, have been groping in the dark. We knew we had these eczemas to treat, we knew there were colicky babies that we could not control, and we wondered why. It never occurred to us at that time to doubt Czerny's assertion that the fat in the baby's food was responsible for these conditions. All of you will call to mind the child with the generalized eczema and how your heart dropped

when you saw that child undressed, knowing as you did that you would in all probability tell the mother she might hope for a cure within twelve to eighteen months.

This work of Dr. Shannon's is an epoch-making thing. It is going to change our ideas very materially in regard to nursing infants and we are going to control the mother's diet instead of telling her that she may have anything to eat that is good for her husband.

There is very little to be said because Dr. Shannon has covered the ground so thoroughly. We know that much can be accomplished by the careful, painstaking study of each individual and a thorough going over of the protein sensitization. Insofar as the cases of eczema are concerned, it is perfectly marvelous to see how rapidly they clear up when the offending protein is removed from the diet of the mother.

The thing I wish to impress upon all of you is not to say to the mother that she may have anything she wishes, but to take the time to find out what it is she is eating that is causing the trouble in the infant. I suppose it is within the memory of some of you that certain foods were formerly prohibited—at least upon looking through the literature one finds reference to the fact that various foods should not be given to nursing mothers, and I am sure we are doing them a gross injustice when we tell them that they may take anything that agrees with them.

Another thing you will all remember. In the literature of infantile eczema, we often run across the statement that it is a bad practice to drive an eczema too rapidly to a cure because sudden death may occur. Sudden death may occur, it is true—we have all seen it,—but it is in all probability due to the overwhelming action of some protein substance that the child is getting through the mother's milk rather than driving to a cure by whatsoever medication may be used.

We feel that this work of Dr. Shannon's is going to revolutionize our ideas of the exudative diathesis.

DR. S. E. SWEITZER, Minneapolis: I think Dr. Shannon is to be congratulated on his original work. I should like to ask what food tests he uses. The children I have had tested very often are not breast-fed so a change in the diet of the mother would not have much effect. Unfortunately, many of the tests do not turn out well. Dr. Shannon has had such very brilliant results in the cases he has reported, that I would like to know what he uses. In the cases I tested, many did not show any reaction.

DR. T. L. BIRNBERG, St. Paul: I rise because I think such a paper should have more discussion. It certainly is a valuable contribution. In the diagnosis of the exudative diathesis we should not accept the opinion of Czerny as infallible. His opinion is not as sharp and fine now as it was years ago. Seven years ago he said that "exudative diathesis was that constitutional condition characterized by an

exudation in the skin and mucous membranes." That covers the manifestations not only of the skin but of the internal mucous membrane. Then he says, the cause is complex; one cause is too much animal fat. That is interesting because, when he spoke that way, he must have meant proteids. He said that the worst animal food was eggs—he did not say cream. Next to that the worst animal food is milk. Milk, he said, was harmful in every respect. Apparently, the fat content is the most harmful, but all other ingredients of the milk are also harmful. That is his opinion of the exudative diathesis as it rests today, and as it was seven years ago. His idea of therapy was to avoid animal foods as much as possible and try to replace them by non-animal foods. If milk should be given, give fat-free milk, and exclude eggs absolutely, which is just what Dr. Shannon has said.

The work Dr. Shannon has done is very interesting and should stimulate our physiologists to do something. We did not realize that the blood was full of egg proteids and meat proteids. Our physiologists will learn more of the why and when and the cause of proteids being circulated in the mother's blood, and consequently we will learn more about the treatment of these exudative diseases.

DR. A. H. SANFORD, Rochester: I wish to congratulate Dr. Shannon. I think that perhaps he has placed a time bomb in the camp of the immunologists, that is, as to the question whether asthma is a manifestation of true "anaphylaxis" or so-called "allergy." The statement has been made that the asthma associated with hay fever is of the allergic type because it is inherited sensitizations and not due to acquired sensitivity to these proteids. Possibly the manner in which the "egg asthma" child acquires his egg sensitization for instance, is through the mother's milk, as described by Dr. Shannon. I would like to inquire of Dr. Shannon whether he has gone into the family history to find whether these children do inherit any tendency to hay fever and asthma. June Adkinson reported in Walker's 400 cases and in Cooke's 600 cases of bronchial asthma that the tendency to hypersensitivity followed the Mendelian law.

DR. ARTHUR H. SCHWARTZ, Duluth: I am sure all the dermatologists will be glad to turn their eczemas over to the pediatricians. (Laughter.) There is no question but that a good many of these eczemas in babies will continue in spite of the fact that they are removed from the breast. Another fact to consider is that an eczema will get better and get worse in spite of treatment.

I would like to hear from Dr. Shannon a little more of the previous history of these eczemas and the beginning picture in these cases.

DR. C. N. HENSEL, St. Paul: Dr. Shannon had a bully paper and I was very glad to hear it. For four years I have been using the skin tests in hay fever and asthma cases and find a number of so-

called "year round hay fever" cases who are sensitive to foods, chiefly the cereals and especially wheat. Cutting the offending food from the diet relieves these cases.

Is this adult sensitization dependent on an infantile food idiosyncrasy—an exudative diathesis? An understanding of this might help in treating adults. It might be well for Dr. Shannon to explain the technique of making the skin tests.

The skin test is absolutely specific; a negative skin test means that the individual is not sensitive at least at that time. Eating of the offending food may cause the skin test to become positive where abstinence from the offending food has caused the test to be negative.

DR. W. RAY SHANNON, St. Paul, (closing): Replying to Dr. Sweitzer, the foods used were those that the mothers most frequently eat—eggs, milk, whatever cereals they most frequently eat, wheat, cocoa, chocolate, and things of that kind. I find very few cases of eczema in breast-fed babies that do not react to one of the foods the mother eats. I do not know how to explain Dr. Sweitzer's lack of success along that line unless it be that he has not interpreted the erythema as a positive result. I know that a positive erythema indicates sensitization because I have obtained results by that method. The erythema will often persist for twenty-four hours and produce an indurated lesion. There is no question but that an erythema within the first thirty minutes in the absence of a similar reaction in the control is an actual indication of protein sensitization.

Replying to Dr. Birnberg, I have had cases in which grape fruit and in others asparagus—definitely vegetable foods—were responsible.

The relation of allergy and anaphylaxis has not been settled. There is a question as to whether there are not two apparently different phenomena, which are perhaps fundamentally the same. Allergy and anaphylaxis were used throughout this paper as analogous terms.

As to family history, there is a very great preponderance of these cases that have a history of asthma and hay fever or eczema in the family just as other men have found. That has nothing to do with anaphylactic manifestations but has to do with the etiology of the exudative diathesis. I did not say that the exudative diathesis was due to anaphylaxis, but that the indications were due to anaphylactic phenomena. Heredity may have its effect on that particular mechanism which permits sensitization to occur, but it has no effect at all on the production of the manifestations in the individual.

I have mentioned the previous history of some of the cases. All of the cases have not been treated previous to my trying the anaphylactic experiments, but the results have been so prompt and so much

better than in other cases that I felt justified in drawing the conclusions I have.

As for asthma in late life being associated with an exudative tendency in early life, there unquestionably is such a relationship. The extensive works Dr. Sanford mentioned have shown that relationship.

The skin tests are made according to the Walker technic, where a scratch is made on the skin and then some 0.1 normal sodium hydroxid is applied. The protein is then dissolved in the solution. The erythema comes on within ten to twenty minutes as a rule. There is often great difficulty in interpreting the reactions, but if you keep in mind that this may occur and are very careful in making the positive interpretations it is a very helpful procedure and will give definite results. The skin reaction is not always specific. You sometimes get a negative reaction in cases that are sensitive to certain types of food. This may occur if the individual has not been eating the food for a considerable length of time, but the cutaneous sensitiveness will recur if he eats the food again. Dr. Walker has already proven this.

MANIFESTATIONS OF THE SPASMOPHILIC DIATHESIS IN OLDER CHILDREN*

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The etiology of the disease entities due to deficiency of the calcium metabolism is still open to much discussion. The literature on the direct causative factor of the failure of proper retention of the lime salt in rickets is extremely voluminous and it is not the intention of this paper to enter into the discussion of the various theories. Rickets and spasmophilia are generally considered more or less distinct conditions. There is no doubt, however, that they are closely related and that both are due to a failure of the retention of the lime salts which are supplied in sufficient quantity in the usual dietary of both infants and older children. We know that spasmophilic convulsions are more frequent in patients showing some of the numerous manifestations of the symptom complex known as rickets. Both conditions are relieved by supplying large amounts of calcium and holding it in by the use of cod-liver oil.

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It has been our experience that the rachitic infant is extremely irritable during the acute stages of the disease. This irritability is ascribed to the pain in the musculature and in the osseous system, in which case the child objects to being handled and refuses to use his muscles. On the other hand, some of it is due, no doubt, to the increased nervous irritability as shown by the Thiemich's and Chvostek's signs, for the nervous system probably suffers equally in the loss of calcium with the osseous and muscular system. Sedgwick¹ defines spasmophilia as "a condition of irritability of the nervous system, especially common in early childhood, distinguished by galvanic and mechanical hyper-excitability of the peripheral nerves and a tendency to tonic and clonic convulsions." The calcium content of the blood is definitely lowered in infants with signs of active rickets and tetany². In older children the findings are far from definite, being subject to slight variations only, nor is the content much influenced by the administration of calcium by mouth³.

The convulsive stage of calcium deficiency is usually the extreme; the child has suddenly lost sufficient lime salts to cause an outbreak of a convulsive nature; or, an acute intercurrent disease further unbalances the already overtaxed nervous system. The prodromes may be slight and are often entirely overlooked, even by the mother. Not uncommonly the first intimation of illness is the convulsion itself. Between the distinct tetanic attacks the child is irritable, restless and peevish. Examination may or may not reveal an acute pathology with high fever to explain the convulsion. In the typical case, Chvostek's and Thiemich's signs are present and the administration of calcium in liberal doses produces prompt relief of the heightened electric reactions and it is often possible to promise the parents that no more convulsions will occur.

In the older child, that is the child between four and seven, the nervous balance is better established and the true spasmophilic convulsion is less common. Assuming that the normal values of Thiemich's sign are about the same in the young infant and in the child of six, the attempt has been made to determine increases in a number of children between the ages of four and seven. Among these it was possible

to show that six had apparently increased electrical reactions as shown in Table 1.

TABLE 1

Number	Age	Sex	CCC Ma	ACC Ma	AOC Ma	COC Ma	Chvostek	Season	Complic.
I	5	F	1.2	4.2	2	*5	2	Fall	
II	7	F	1.8	3.8	2.0	*5	2	Fall	
III	6	M	2.4	*5	2.4	*5	1	Spring	Tonsillitis
IV	3	M	0.8	4.0	1.2	*5	1	Spring	
V	3½	M	1.6	3.5	2.0	4.2	2	Spring	
VI	4	F	2.1	*5	2.4	*5	0	Spring	Pyelocystitis

These six children were brought for examination because of extreme restlessness, peevishness, anorexia and disturbed sleep. Physical examination in all except cases three and six showed a normal child. Case three had a mild sore throat, and case six chronic pyelocystitis under treatment. Cases one and two occurred in the fall of the year and the others in the spring.

In five of these cases calcium was immediately prescribed, giving six grams of the chloride in twenty-four hours. In the earlier cases, i. e., one and two, no cod-liver oil was given until after the second examination⁴. In case six no calcium was given, but the child immediately received 8 c. e. of cod-liver oil twice daily⁵. The results of the administration of the more or less specific agents upon the electrical reactions is seen in Table II.

TABLE II

Number	Therapy	Days Since 1	CCC	ACC	AOC	COC
I	Calcium chloride 6.0 daily	4	2.1	*5	2.4	*5
II	Calcium chloride 6.0 daily	3	2.0	*5	3.0	*5
III	Calcium and cod liver oil	7	3.4	*5	*5	*5
IV	Calcium and cod liver oil	5	3.0	*5	*5	*5
†V	Calcium and cod liver oil	10	2.0	4.8	2.5	*5
VI	Cod liver only	16	4.	*5	*5	*5

†Refused cod liver oil.

The results as judged from the electrical reactions are definite, but not nearly as satisfactory

as the reports of the parents. Cases one and two were given the classical Kassowitz mixture immediately after the records shown in Table II were made and in a few days time the restlessness was very markedly reduced. Cases three and four showed prompt improvement in their general condition. One mother reported that the child could now sit still for a minute at a time. Case three was treated for the mild tonsillitis. Case five was a rather difficult patient and the Kassowitz prescription had to be given in form of an emulsion before the child would take it. After this the "nervousness" improved. He has since spent most of his time out of doors quiet and sedate. Case six responded quickly to the Kassowitz, calcium was not given because the patient was taking potassium citrate to alkalinize the urine. The pyelocystitis has practically cleared up.

Case four was the most typical of the group and a resume of the history is cited.

R. B. Born May 15, 1918. Three years old at time of examination. Second child. History of infancy shows some difficulty in feeding. Child had breast and complemental feeding until six months of age after which a whole milk mixture. There is no record of rickets. At 18 months had slight convulsion, said to have been brought on by acute tonsillitis.

Present complaint: Mother brings child because of extreme irritability, cries very easily, constipated, appetite very poor, extremely restless sleep, waking up with a cry and refusing to go to sleep again unless rocked. All this, according to the mother, is very unusual. "He can't sit or stand still a second."

Examination: A well developed child of moderate nutrition, good musculature, slightly precocious, color good. Child is rather difficult to examine. Weight 30.5 pounds, Hb. 80 per cent, WBC. 9,280. Urine negative. Temperature 99°. The physical examination showed no abnormalities, excepting moderately enlarged tonsils and probably some adenoids, but no mouth breathing. No rosary or enlargement of the epiphyses. A very slight bowing of lower third of tibia, but otherwise straight and well formed. Electrical reactions were taken and found to be as shown in Table I, Case IV.

Treatment: With regulation of diet and general hygiene, the child was put on calcium chloride 1.0 gm. six times per day, and 8 c.c. of the phosphorous and cod-liver oil prescription twice a day.

Subsequent course: After five days, mother reports child distinctly less "nervous." Sleeps better, but is still fussy. The electrical reactions as shown in Table II. Physical examination as before. The

medication was continued giving the calcium for twelve days and the cod liver oil for one month. At the end of that time the electrical reactions as in Table II and according to report of mother the child was normal. The Hemoglobin was 85 per cent and the appetite excellent, sleep absolutely undisturbed. and cod liver oil prescription twice a day.

CONCLUSIONS

1. While the chemistry of the blood may not reveal great changes in the calcium content, there is a hyperexcitability of the nervous system which can be shown by the electrical reactions.

2. The condition is relieved by the use of liberal doses of calcium, combined with cod-liver oil.

3. The determination of the electrical reactions is a simple procedure and the results obtained justify the further study of the condition.

400 Lyceum Bldg.

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DISCUSSION

DR. T. L. BIRNBERG, St. Paul: It gives me great pleasure to be able to discuss this paper. Unfortunately, spasmophilia in older children has been neglected. There is no doubt that spasmophilic symptoms persist into later childhood, "late spasmophilia." In fact, not only is spasmophilia continued into later childhood, but observation shows that almost all patients who had spasmophilia in infancy became neuropaths in adult life. Still further, observers agree that not only is spasmophilia extended into adult life, but begins, in fact, before the child is born. That is, there is a constitutional, inherited predisposition to spasmophilia in certain families. In fact, certain races even show weakness in this direction. I have seen a few cases of spasmophilia in breast-fed infants, but almost all of them had a neuropathic inheritance.

This brings us to the modern conception of peditrics; that is, all infants can be divided into groups, or diatheses. Old fashions return even in medicine, and, as Gerstley ably wrote, children should not be treated as heart cases or kidney cases but as patients first, and as having a diseased heart of kidneys or nervous system second. A child should always be treated with its constitution in mind, whether it be spasmophilia, exudative diathesis or pastoes diathesis. These children with the neuropathic constitution show symptoms early in life. They are nervous, irritable, sleepless and easily aroused by the slightest noise. This continues, more or less, all through life and, if the calcium content becomes low, they easily get convulsions.

When this type of child gets an infection he is prone to convulsions, while another type of child would not react. We have noticed this spasmophilic tendency in other conditions besides convulsions, especially in cyclic vomiting, where in spite of tonsillectomy and correction of diet and attacks of vomiting occur, showing a neuropathic root. These patients have a marked "chvostek". We find great improvement in increasing their calcium absorption by means of phosphates and cod liver oil.

Another type of late spasmophilic manifestation is in the type of asthma without food sensitization or infection. Here often a marked Chvostek is found and considerable improvement obtained by phosphates and cod liver oil.

In our cases of convulsions, due to later spasmophilia, we have the same good results from the phosphates and cod liver oil that Dr. Scherer has shown. First, the child is less irritable between attacks, then the convulsions disappear. The clinical signs are more important than anything else. The electrical reaction are not reliable, for one day they are present and the next, they are absent again.

As to the point mentioned by Dr. Scherer of the effect of seasons. The seasons effect spasmophilis in two ways. First, in spring and fall we have less sunshine than in summer and consequently more spasmophilia. As Dr. Hess has shown, in exposing a child to direct sunshine the calcium content of bones will increase; second, in spring and fall we have more infections, which stir a latent spasmophilia into an active one.

DR. HENRY W. WOLTMAN, Rochester: We see a number of adults who have decided evidence of tetany, and a great many give a history of having had attacks in infancy that were probably spasmophilia.

I understand that infants respond very well to cod liver oil and calcium. I do not see why there is such a marked difference in response to therapy between tetany in infants and in adults. I wonder whether Dr. Scherer can explain this.

DR. HERBERT WILLIAM JONES, Minneapolis: I think this is very important work, and Dr. Scherer should carry it on. I think it comes in line with Dr. Bloodgood's remarks, that if we are to cure disease we must stop it before it starts. It seems these children inherit improper tendencies and these tendencies are increased by improper feeding and things of that kind. In one family that I have taken care of for many years the father was a neuropathic man who used to get up at night and figure how he could make more money out of a deal than somebody else. His four children have all inherited that extreme neuropathic tendency. Two boys married and they have children. One of them married a girl with this extremely irritable nervous system, with pains in the back and so on, and the other married a rather stable girl with a normal nervous system. The children of those parents who are both rather spasmophilic have been very neuropathic and probably will grow up that way. The boy who married a girl with a stable nervous system has a rugged child, who will probably grow up that way. I think this work is very important for the future of our race and hope it will be carried on.

DR. C. A. SCHERER, Duluth, (closing): Dr. Woltman's discussion reminds me of an experience when I first started this work. A colleague approached me with the same question and tried it out on a woman, and I think she sued him for malpractice. Personally, I cannot see why the adult should not respond to the use of calcium chlorid and especially when used with cod liver oil to increase the retention of the calcium salts, but I do not know that any work has ever been done on it as the subject has interested only pediatricists.

Dr. Jones has thrown a confusing element onto the perfectly clear disease entity of spasmophilia due to failure of retention of lime salts. His contention is very interesting because in following up the family history we may get to the causation of rickets. At present the literature is filled with the etiology of rickets, and there are many different viewpoints. I think a study of the parents, questioning whether they have ever had any trouble that could be laid to failure of retention of lime salts, may give us an inkling of the basic causation of rickets.

URINARY LITHIASIS IN CHILDREN*

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Differences of opinion exist concerning the prevalence of urinary lithiasis in infancy. In this country few cases have been reported and the text books and journals contain few reports or articles concerning the subject.

Collins, in 1913, reviewed the literature and reported a patient whom he had observed. This is the most complete contribution that has been published in the United States.

OCCURRENCE

Holt, basing his observation on a thousand autopsies, finds calculi common in infants. He writes that stones are frequently voided during the first two years of life. Langenbeek found a calculus in the bladder of a six months' fetus. Brendel reports two babies with urinary lithiasis occurring two days after birth. The foreign literature contains large series of reports of urinary stones in infants. One writer found forty-seven per cent of a large number of urinary stones occurring in children. Another writer located in Hungary, collected eighteen hundred and thirty-six reports of children with urinary lithiasis. Dr. J. O. Thompson found thirty-eight per cent of five hundred and eighty-six patients with urinary stone in children under fifteen years of age. This report is from the Canton Hospital.

We have been able to collect, by means of a letter sent to the members of the American Urologic, American Pediatric and the Central States Pediatric Societies, two hundred and three reports of children or infants with urinary lithiasis. Included in this series are five patients whom we have personally examined and studied.

The average age is seven and eight-tenths years. Forty of the total number of cases collected, occurred in children up to five years of age, sixty in children between five and ten years,

and fifty-eight between ten and fifteen years. In forty-five instances the age was not given. We found one hundred and fifty-five males and forty-five females (about three to one). In three the sex was not specified.

From the data which we obtained by means of this circular letter, we were unable to determine the relative frequency of urinary stones in infants as compared with adults. We are of the opinion, however, that this condition occurs much more frequently than is generally supposed. Many cases are not recognized. It is quite certain that a great many small stones are passed by the infant after a supposed attack of intestinal colic. Unless the urine has been totally arrested for several hours or a day, the mother's or the physician's attention may not be directed to the urinary organs so the urinary stone is not suspected. Children living in certain localities seem to be more susceptible to stone formation.

ETIOLOGY

Although infants, children and adults, are not subject to the same degree of infection and trauma, the same theories can be used to explain the formation of stone. It is not possible for us to estimate the number of children who suffered from severe infections, nor could we estimate the relation of trauma to stone formation. The nutrition of the infants or children was not considered. The type of food which was given, whether breast fed or not, was not observed. These data are important and will form the basis of a paper which we hope to publish later.

One writer is of the opinion that stones are more prevalent in children who have passed through one or more of the severe infections. Kretschmer, in a recent paper on "The Treatment of Pyelitis in Infancy and Childhood," found stones present in a number of instances. It is rather difficult, however, to determine which was present first,—the stone or the infection. The composition of the stones removed was not ascertained. As the organs of metabolism in the infant and child are more subject to upsets than those of the adult, it is possible to believe that faulty metabolism, together with infection and trauma, may be the basis of kidney stone.

The large fluid intake of most children and infants, if such fluids contain an excess of salts

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with peculiar chemical properties, may explain the formation of calculi.

Keyes, in a recent article writes. "Urinary stones consist of nonacicular crystals about a nucleus of organic matter." He also states. "Concentration of the urine in the presence of pus or blood, due to trauma or disease, must be the occasion of stone formation."

LOCATION

The location of the urinary stones in the two hundred and three patients which we report is as follows:

Right kidney twenty-one patients, or ten per cent; left kidney eight, or three and nine-tenths per cent; right ureter, seven or three and four-tenths per cent; left ureter, eight or three and nine-tenths per cent; bladder, one hundred and sixteen or fifty-seven per cent; urethra, twenty-five or twelve per cent; one kidney and one ureter, nine or four per cent; both kidneys, fourteen or six per cent; both ureters, one; both kidneys and ureters, one.

In this series sixty-nine per cent of stones had passed from the kidney or were formed in the lower urinary tract, that is, the bladder or urethra. We found thirteen per cent in the kidneys only and eight per cent in the ureters only. In other words, the majority of kidney stones in children seem to pass from the kidney. It is interesting that only eight per cent of stones were found in the ureter, indicating that stones pass rather easily through the infant ureter and that only a small number remain in the kidney. Although important, we did not get information which made it possible for us to determine the number of patients with stone in the kidney as compared with those with stone in the pelvis.

SYMPTOMATOLOGY

CHART I

	Pain	Hematuria	Pyuria	Dysuria	Frequency	Nausea and Vomiting
Renal stone....	93%	57%	30%	11%	30%	4%
Ureteral stone..	87%	54%	20%	12%	39%	10%
Bladder stone...	60%	42%	48%	50%	50%	0%
Urethral stone..	68%	48%	28%	48%	48%	0%

Considering the entire urinary tract, we find the following symptoms most common: (1) pain and colic, (2) hematuria, (3) frequency, (4) pyuria, (5) dysuria, (6) nausea and vomiting.

Pain occurred more often with kidney stone

than with stone found in the bladder, ureter or urethra. Pain was a prominent symptom in fifty-four per cent of the total number of patients reported. As in the adult, renal stone in the infant may be symptomless. When they are loose in the pelvis and lodge in the uretero-pelvic juncture or in the ureter, pain is pronounced. In very few instances, however, was prolonged, severe pain a prominent symptom. We find that ninety-three per cent of renal stones gave a history of pain, indicating that the great majority of the stones found in the kidney, were loose in the pelvis. In adults, renal stone in the kidney cortex may cause little or no pain. In this series we find that only eighty-seven per cent of the patients suffering with ureteral stone complained of pain. The infant's ureter must be capable of great distention and complete plugging or obstruction cannot occur as often as it does in the adult. We know of no condition that will as universally produce severe pain as will the passage of a stone through the ureter. Frequently, it is necessary to differentiate renal or ureteral pain from intestinal colic. With intestinal colic, the child cries intermittently, while in the presence of ureteral stone the baby or child may cry for many hours because the pain is usually continuous. The sudden cessation in the crying may indicate that the stone has passed into the bladder or has passed through the urethra into the napkin. With ureteral stone, diarrhea is absent. This finding is usually positive with intestinal colic.

In Monsseaux's series of eighty-seven patients, *hematuria* was present in only eight. It is infrequent that an urinalysis is made in infants suffering with abdominal pain (fifty-two per cent in this series) so that gross blood is more often reported than microscopic blood. It is our opinion that an urinalysis of every patient would reveal blood in a larger number than we were able to report. Gross blood in the urine does not seem to be diagnostic of the location of the stone, as in this series this finding was of approximately equal frequency. With kidney stone, blood was reported in fifty-seven per cent; with bladder stone forty-two per cent; with ureteral stone fifty-four per cent and urethral stone forty-eight per cent.

Pyuria was reported in forty-eight per cent

of bladder stones and in thirty per cent of the renal stones. This is a report of macroscopic findings and does not indicate the findings after a microscopic examination. Because of the infrequency of an urinalysis, it is impossible to determine the relative frequency of pyuria.

Dysuria with bladder and urethral stone was reported in fifty per cent of the cases. With ureteral stone, this symptom was noted in twelve per cent and with renal stone in eleven per cent.

Anuria may occur when a stone becomes lodged in the urethra or may occur when one ureter is occluded, the sound kidney being reflexly affected. This symptom in a great many cases has called the mother's or the physician's attention to the urinary tract. When children have not passed urine for several hours or days, the introduction of an urethral catheter may be impossible because of obstruction in the urethra caused by a stone. In many instances, a diagnosis had not been made until urethral catheterization had been attempted.

Frequency of urination, as would be expected, was reported more often with bladder and urethral stones (fifty and forty-eight per cent) than was found with renal or ureteral stones (thirty and thirty-nine per cent).

Nausea and vomiting which is a very indefinite symptom, when one is considering children or infants, was reported in ten per cent with ureteral stones, and four per cent with renal stones. With bladder and urethral stones, nausea and vomiting was not noted.

Tumor. Kidney enlargement or the formation of a tumor, was a very inconstant finding. We were unable to estimate the number of patients with tumor.

DIAGNOSIS

In the young infant, the diagnosis may be difficult. Sudden, prolonged abdominal pain, most frequently without warning, without diarrhea and with or without gross hematuria in an infant who has had no recent gastro-intestinal upset, should make one suspicious of renal or ureteral stone. With bladder or urethral stone inability to urinate, or continuous, frequent and painful urination with blood in the urine is found in the majority of patients. The location and radiation of the pain may be help-

ful but cannot be relied upon. The presence of tumor, which is rare, may assist in the diagnosis. Tenderness may be elicited over the affected side.

The x-ray will assist in the diagnosis and should always be used. In one hundred and twelve instances in two hundred and three reports, stones were discovered by the x-ray. Tiny stones may be missed but the majority will make a shadow on the plate or film. The finding of bits of gravel in the urine or urethra clinches the diagnosis. Urinalysis is usually difficult and may be negative but should be made, as the finding of blood or pus cells assists in the diagnosis.

Cystoscopy although difficult, can be done in very young children. Girl babies of six months have been cystoscoped with the separation of the urine. In young infants a rectal injection of ten to fifteen grains of chloral hydrate produces sound sleep which is as satisfactory as an anesthetic. Children remain quiet and suffer little pain so that ureteral catheterization and pyelograms may be made when necessary. We have successfully cystoscoped and catheterized boys of five years of age. A double pyelogram was done in a boy of eight. In boys a small instrument which has a small beak can be used with little trouble. Great care should be exercised as the urethra is easily torn, and when such an accident occurs a stricture will usually follow. It is advisable to split the meatus, which will greatly assist in the safe passage of the instrument into the bladder. Cystoscopy should be done whenever possible together with the catheterization of the ureters. Sixty-seven of the two hundred and three patients herein reported were cystoscoped. We have repeatedly noticed the large calibre of the infant's ureter when compared with the bladder and urethra. The largest catheters can be passed with ease. This observation has been made in the normal infant as well as in those having stone or infection.

A diagnosis was made from clinical findings alone in twenty-two instances. Rectal examination should never be overlooked. The ureteral stone found in one of our patients was easily palpated per rectum.

TREATMENT

Early surgical removal should be practiced, when the stone does not progress or when an

emergency exists. When patients are too small to permit of cystoscopy, x-ray, or ureter catheterization together with functional tests, exploration should be done first to determine the presence of both kidneys and, second, to remove the stone or stones. Bilateral lithiasis, especially when the stones are small, multiple and in the cortex of the kidneys, should not always be treated surgically. The removal of cortical stones does not remove the cause of their formation, so that the amount of destruction necessary to remove them should be weighed against the destruction being caused and the probability of the stones finding their way into the pelvis and passing through the ureter. In this series, sixty-nine per cent of stones were found in the bladder. A careful study of the histories that we have collected indicates that the majority of urinary stones found in the bladder except in the presence of urethral obstruction, bladder deformity or spinal cord lesion, originate in the kidney.

One hundred and fifty-five patients were operated upon. In three, the stones passed per urethram and effected a cure. In nine patients, the stones were probably passed, although they were not recovered. In ten, treatment was refused. In twenty-four patients, there was no report as to treatment. In our opinion the surgeon should not operate on kidney or ureteral stones in infants unless it is definitely determined that the stone will not progress or is causing damage, as most of them will pass as far as the bladder.

Cystotomy or cystoscopic removal can be done with much less trauma to the patient than an operation for the removal of a kidney stone or an ureteral stone. In this series, we find that seventy-eight per cent of the operations which were done for the removal of urinary stone were cystotomies, urethrotomies or some type of manipulation, or cystoscopic removal.

Post operative and medical treatment should consist of the early removal of all possible foci of infection. A careful diet should be followed together with the correction of over alkalinity or acidity of the urine so that it will not contain an over abundance of solid substances. Plenty of good water should be given which should not contain above the average of

salts. A careful hygiene should be maintained so that the child is protected from infections and trauma.

CHART II

Cyst-otomies	Ureter-otomies	Pyel-otomies	Nephrotomies
77 suprapubic	5 primary	8 primary	6 primary
4 perineal	1 preceding nephrectomy	1 bilateral	2 bilateral preceding nephrectomy
Nephrectomies	Nephropyl-otomies	Meat-otomies	Urethrotomies
4 primary	1 primary	11 primary	2 primary
1 following ureterotomy	3 bilateral		
1 following nephrotomy	Thirty-two cases of manipulation or crushing through cystoscope, etc.		

PROGNOSIS

A large number of the reported cases of lithiasis in infancy and childhood were discovered at autopsy. In only two of our patients, diagnoses were made at autopsy. In Collin's report forty-three per cent of the patients with urinary stones were discovered at post mortem; ninety-two per cent of these under five years of age occurred before the second year, indicating a high early mortality. Kidney stones can be present for years without materially affecting the function of the kidney. As the infection increases, however, the kidney may be quickly destroyed. Bilateral involvement is very frequent. American and foreign authors report sixty-five per cent and fifty per cent. In our series, bilateral stones were found in thirty-three per cent. Early diagnosis, together with proper treatment before kidney destruction takes place, will save many kidneys and possibly a few lives.

The results of treatment are as follows: one hundred and one, or fifty-four per cent, were reported cured; ninety-five, or forty-seven per cent, were not reported; five, or two and one-half per cent, had recurrence of symptoms and two died.

MORTALITY

There was an operative mortality in this series of six-tenths per cent. We are unable, however, to trace many of the patients reported over a long period of time.

CONCLUSIONS

1. Urinary lithiasis is frequent in childhood and infancy, the average occurrence in the three large series reported being forty-three per cent;

the average age is seven and eight-tenths years. The youngest patient in this series was ten months old.

2. We are unable to determine the etiology of urinary stones in infants, although in our opinion infection is one of the factors.

3. In twenty-one per cent of our cases stones were found in the kidney or ureters. The comparison of right kidney to left is as twenty-one to eight. Only eight per cent were arrested in the ureter. Sixty-nine per cent of stones were found in the urethra or bladder. A large number of these had their origin in the kidney.

4. The symptomatology in the order of occurrence is as follows: (1) pain and colic; (2) hematuria; (3) frequency; (4) pyuria; (5) dysuria; (6) nausea and vomiting.

5. Cystoscopic examination can be made in very young infants. The size or age of infants should not be contraindications.

6. The infant ureter is proportionately large, is capable of great distention and facilitates the easy passage of stone.

7. The diagnosis is made from the following positive findings: (1) x-ray (fifty-five per cent); (2) urinalysis (fifty-two per cent); (3) cystoscopy (thirty-three per cent); (4) clinical findings alone (eleven per cent).

8. Surgery is indicated when stones do not progress through the urinary tract. Seventy-eight per cent of operations were done upon the bladder and urethra. When renal stones are bilateral, surgery should be carefully considered.

9. The prognosis is unusually good. In this series, there were two deaths, one with bilateral stones the other occurring in conjunction with urinary malformation; fifty per cent were reported cured; two and one-half per cent had recurrence of symptoms and forty-seven per cent were not reported.

10. Urinary stone in children may remain symptomless for many years. In one of our patients, ureteral or bladder stone had been present for eight years with slight symptoms.

11. Stones discovered during adult life may have their beginning during childhood or infancy.

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DISCUSSION

DR. ARTHUR N. COLLINS, Duluth: I wish to express my appreciation of this opportunity of listening to the very valuable paper of Drs. Thomas and Tanner on urinary stone in infants. They should be highly commended for bringing to us the results of their extensive and painstaking survey of the literature on this important subject and for their careful and instructive analysis of the material facts.

I wish also to acknowledge with pleasure their compliment paid my modest contribution to this subject some eight years ago. At that time I reported the case of an infant of sixteen months with multiple stones in the urinary tract, and I have repeatedly besought my pediatric friends to be on the lookout for calculi in infants and children and to follow up their cases of infections in the urinary tract with the x-ray and the microscope.

The authors, by dint of much industry, have accumulated reports of 203 infants or children with urinary lithiasis. This is a goodly number and quite

sufficient for a few tentative conclusions for the guidance of those interested in this subject. It is interesting to note that they found 155 males to 45 females, or about 3 to 1. In the series of 322 cases which I collected the proportion was about 2 to 1.

A valuable bit of information is contained in the fact that in their series 69 per cent of the stones were in the lower urinary tract, and that but 8 per cent were in the ureters. The utility of the fact is spelled in better surgical prognosis. These stones are easier of attack in the lower tract.

Several authorities have expressed the opinion that stones discovered in later life have their origin in infancy or childhood.

The case reported by the authors is evidence of such contention. I have just recently seen a case in consultation with Dr. Scherer, a little girl of about 9 years having a renal stone with symptoms dating some time back.

I am glad to see a more promising note in the surgical aspect of this subject. Eight years ago I found comparatively few successful surgical reports. Drs. Thomas and Tanner report 155 patients operated upon and a mortality of but .6 per cent. This is indeed gratifying. A large proportion of this advance is due to the skillful use of the cystoscope and of crushing operations. Seventy-eight per cent of these operations were cystotomies, urethrotomies or some type of manipulation, or cystoscopic removal. About 28 of them were operations upon the kidney itself. It would be interesting to know the separate mortality of this type alone.

Stone cases in infants and young children should receive careful vigilance. Unless the calculi are discovered earlier and removed promptly the mortality will remain high. There is a delicate point resting uncertainly between waiting for the stone to advance along the tract and the decision upon surgical removal, which should be constantly in the mind of the surgeon. Delay in surgical removal should not be continued to the point where destruction of kidney substance progresses to cripple the organ, or infection becomes a grave complication.

DR. GILBERT J. THOMAS, Minneapolis, (closing): We have seen at the University Hospital and in our private work six or seven cases of urinary lithiasis in children, and the reason for writing the paper was that most of the cases were undiagnosed. They were sent in for other conditions. An x-ray examination was rarely made to determine the existence of a stone, and in only one case was a stone suspected. Cystoscopy was not thought of. The two cases reported as fatal were both operations on the kidney, one of which was for bilateral stones. The other case was a kidney malformation.

In answer to Dr. Collins' question our reports show that the only mortality was from operations on the kidney.

A REPORT OF FIVE CASES OF SO-CALLED ACRODYNIA

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Several reports have appeared recently of an obscure disease affecting infants and young children. Weston, who published the first report named the condition "acrodynia," first described in 1828.⁴

During the summer of 1921, five children suffering from a malady resembling this disease were observed in the Mayo Clinic. Histories of these patients are reported herewith:

HISTORIES OF CASES

Case 1. (A362034). W. S., a boy, aged twenty-one months, was brought to the Clinic June 21, 1921. The child had been breast-fed for twelve months, and thereafter, had been fed a general diet, including meat, potatoes, butter, bread, and milk. About six weeks before, the mother had noted a change in the child's disposition. He had become restless, and peevish; he had cried a greater part of the time, and slept very poorly. A short time later, an eruption appeared on the body. He scratched violently, knocked his head against the floor and bed, pulled out his hair, and slept in grotesque positions. Small white sores had appeared under the tongue and the eyes had become sensitive to light. Two weeks before, the fingers and toes had become reddened and swollen; this was followed in a few days by scaling. His appetite had remained good, although he had lost 5 pounds in weight. He had not walked since the onset of the symptoms.

On examination the child was drowsy, almost stuporous. His features were the prototype of distress and wretchedness; the head was bowed as if to avoid the light; the muscles were flaccid and he sat erect only with difficulty. A fine, thickly-studded papular eruption was distributed over the trunk and extremities. On the fingers and toes was a brown induration and intense erythema faded out toward the arms. Pressure over the tibia produced pain. A large shallow ulcer with a necrotic base, limited to an area 1.2 cm. in diameter, under the tongue extended in a few days to the gums of the lower jaw, resulting in a slough of the alveolar processes and a falling out of the four lower incisors. The conjunctivæ were deeply injected. The knee jerks were absent. An intermittent fever, with no other demonstrable cause than the sloughing ulcer was present throughout the period of observation. The hemoglobin was 61 per cent, the erythrocytes were 4,360,000, and the leukocytes 11,400. The urine contained a large amount of albumin. The Pirquet's and Wass-

ermann reactions were negative. Roentgenograms of the extremities were negative. Cultures from the throat, eyes, and stool were negative.

He was placed on a general diet which he took well, and given cod liver oil and hypnotics for marked restlessness. He improved slowly but steadily.

Case 2. (A362318). V. M. H., a girl, aged two years, was brought to the Clinic, June 21, 1921. The child had been breast-fed and thereafter received a well balanced diet consisting of milk, cereals, and vegetables. She had always been constipated. In February, she had an obscure fever for two weeks with drowsiness and prostration; after that a period of well being. She became irritable, developed marked anorexia, and began to lose weight. A short time later, a persistent pimply rash over the trunk and extremities, and a marked pruritus of the hands and feet appeared. Rubbing the soles of her feet quieted her. She had sweated excessively and complained of pain when lifted, since the onset of the symptoms. She became very weak and unable to walk. She had lost 6 pounds in weight.

Examination revealed a wretched appearing, poorly nourished child, very irritable and crying constantly. The typical papular eruption was scattered over the trunk and buttocks, and about the groins was an intense erythema accompanied by a coarse desquamation. The fingers and toes showed a fine scaling and a few small superficial infections. The hands and feet were constantly moist with perspiration. Pressure on the abdomen and extremities elicited tenderness. The muscles were soft and flabby. The reflexes were normal. There was an unexplained fever, intermittent in character and reaching 100. The hemoglobin was 89 per cent, the erythrocytes 5,740,000, and the leukocytes 18,200. The Wassermann and Pirquet's reactions were negative. Roentgenograms of the chest and extremities were negative.

The treatment consisted of forcing an ample general diet. The child improved gradually.

Case 3. (A360515). E. E. H., a boy, aged sixteen months, was brought to the Clinic June 24, 1921. The child had been breast-fed for one year. He had had a mild eczema, limited to the face during the first year and a severe attack of pertussis in February, 1921. In March, a spotted eruption had appeared on the hands and feet, which soon spread over the entire body; desquamation had followed in a few weeks. The condition of the skin had persisted, and had been accompanied by a very severe pruritus. The child had been extremely irritable and had slept poorly. He had pulled out his hair, rubbed his forehead on the floor and bed, and assumed queer and unusual postures. He had been soothed always by rubbing the soles of his feet. One week before, small white sores had appeared on the side of the tongue. During the course of his illness he had had a bilateral suppurative otitis media for two months, a severe diarrhea for three days, and a

slight unexplained fever on two occasions. He had been weaned very shortly after the onset of the illness and had eaten apple sauce, potatoes, butter, and milk. The mother stated, however, that his appetite had been poor. His muscles were weak, and he had evinced no desire to stand or walk. He had lost 5 pounds in weight.

At the time of examination the child was irritable, and restless. Patches of fine, red, thickly studded papular eruption were distributed over the trunk and extremities. Palms and soles were desquamating in fairly large flakes. The muscles were flabby and relaxed but the reflexes were exaggerated. The mucous membranes of the mouth were slightly reddened and injected, and on the side of the tongue was a shallow ulcer about 1 mm. in diameter, with a white base. The hemoglobin was 66 per cent, the erythrocytes 4,110,000, and the leukocytes 13,900. The polynuclear neutrophils were 62 per cent, lymphocytes 22 per cent, large mononuclears 4.5 per cent, transitionals 9.5 per cent, eosinophils 1.5 per cent, and basophils 1.5 per cent.

The child was placed on a forced general diet and cod liver oil. His appetite soon became excellent, the skin cleared markedly, and he gained 1.5 pounds in three weeks.

Case 4. (A363028). R. H., a boy, aged sixteen months, was brought to the Clinic June 29, 1921. He had been breast-fed for nine months, then placed on a general diet, including milk, oatmeal, eggs, butter, toast, and a small amount of vegetables. He had had frequent acute respiratory infections. He had been extremely constipated. The onset of the condition occurred in April, 1921, with photophobia, peevishness, almost constant crying, and the appearance of a pimply eruption over the body. Shortly afterward his feet and hands began to itch. He could always be quieted by rubbing the soles of the feet. Desquamation had been observed for about six weeks. He bit his hands and tore out his hair. He took very little food except about 20 ounces of milk daily. He had lost 10 pounds in weight. He was exceedingly irritable, markedly emaciated and he had a constant pitiful whine. All the muscles were extremely flabby and relaxed. The typical papular eruption covered the body, except the face. The fingers and toes were slightly red and swollen and had a coarse desquamation over the terminal phalanges. The mucous membranes of the mouth were slightly injected. The reflexes were normal. The Wassermann and Pirquet's reactions were negative. Roentgenograms of the extremities were negative. The hemoglobin was 72 per cent, the erythrocytes 4,600,000, and the leukocytes 10,700. The polynuclear neutrophils were 41.5 per cent, lymphocytes 47 per cent, large mononuclears 7 per cent, and eosinophils 4.5 per cent.

The child was placed on a general diet and cod-liver oil. He improved slowly.

Case 5. (A366530). H. B., a boy, aged eighteen

months, was brought to the Clinic July 29, 1921. The child had been breast-fed for nine months, and thereafter, had received food from the family table, apparently a well balanced, ample diet. He had had pertussis in July, 1920, and bronchitis of moderate severity in February, 1921. The onset of the present illness had occurred eight weeks before with loss of appetite and the appearance of a rash first on the face and later over the entire body. Itching from the first appearance of the rash was most intense. For four weeks the child had been very irritable and had slept poorly. He had been weak and had remained in bed with his head buried in the pillow most of the time, as if his eyes were sensitive to the light.

The child was very poorly nourished and all the muscles were extremely flabby. Over the chest, forearms, and abdomen were dense patches of pinpoint papules showing fine desquamation. On the distal phalanges were large scaling patches.

He was placed on cod-liver oil and a general diet. Definite improvement occurred.

DISCUSSION

The outstanding features in these cases were the manifestations of the skin and nervous system. Marked loss of weight occurred in each case. All the muscles were soft and flabby and the patients so weak they could not stand unsupported. Two of the five sweated profusely.

Before the onset of the disease the children had been happy and normal. They became peevish, restless, and irritable; cried a great deal and slept poorly at night. Their wretched, anxious, and worried expressions bore out the truth of the history. Two of the children beat their heads against the floor or the bed to a point of alarming injury. They bit their fingers and rubbed them on their teeth so that the hands became macerated and infected. Three pulled out their hair. Two slept in various grotesque positions. Four were intolerant to light. Two were definitely tender to touch over the body. The knee jerks were variable; normal in three, absent in one, and accentuated in one.

All the children had a fairly profuse papular eruption over the trunk and extremities; the papules were light red, pin-point, and closely studded, usually occurring in patches. Itching varied from moderate to maximal severity. In three of the children, the papular rash extended to the fingers; in the other two erythema was diffuse, gradually fading toward the arm. There was a variable amount of doughy swell-

ing of the fingers and great toes. None of the children had the extreme erythema, swelling, and cyanosis which has been reported by other observers. Small superficial pustules were present on the fingers of two infants and one child developed a severe infection of the great toe. All desquamated medium sized flakes; some had scaling over the trunk. The pruritus on the palms and soles surpassed that of any other part of the body. Three of the children could be quieted, no matter how restless, by rubbing the soles of the feet.

The mucous membranes of the mouth were slightly reddened in all. A large shallow ulcer, with a necrotic base, was found under the tongue of one child; it extended to the gums of the lower jaw resulting in a falling out of four incisors and sloughing of the maxillary processes. One child had a small ulcer of similar character on the tongue; another had a moderate gingivitis.

Except for a transient attack of bronchitis in one infant the cardio-pulmonary system was negative in all cases.

Three of the children lost their appetites; one ate fairly well; the one most severely ill had a good appetite; he had, however, lost 5 pounds in weight. The children had been breast-fed to nine months or beyond and had thereafter received a well balanced diet up to the time of onset of symptoms. Two of the children had been markedly constipated before the onset of the symptoms. One had diarrhea for a few days.

One child had large amounts of albumin in the urine; one had had pyelitis during the course of the illness.

All of the children had had a low grade fever during most of the illness. Cause for the pyrexia was demonstrated in only two of the five.

None of the children were markedly anemic. One had an unusually high erythrocyte count and hemoglobin reading, perhaps owing to a blood concentration; this same child had leukocytosis. The three others had only a moderately increased leukocyte count. The Pirquet's and Wassermann reactions were negative in all. Roentgenograms of the extremities obtained in three cases were negative.

SUMMARY

It seems hardly justifiable to ascribe to "acrodynia" the peculiar malady from which these five children were suffering. The acuteness of the symptoms and the highly contagious character of the epidemic in Paris⁴ are in contrast to the chronic course and the very mild contagious character of the disease of the patients under our observation. Moreover, there have been no reports of the disease in adults during the past few years, whereas, during the Paris epidemic, no mention was made of the disease attacking infants and young children. There are, on the other hand, some points of resemblance; namely, the paresthesias and wasting and erythema of the extremities. However, there can be little question of the similarity of the disease under our observation with that described by Weston, Byfield, Miller, Cartin, Brown, and others.

The possibility that food deficiency may be a cause of the disease has been suggested, but in our patients there did not appear to be any fault or demonstrable defect in the diet. All of the children had been breast-fed and after weaning, had been placed on an ample well balanced diet. The therapeutic response to forced feeding cannot be interpreted as a result of supplying lacking accessory food factors. There is no reason to suspect any connection with pellagra.

Except for a temporary bronchitis and a transient otitis media, no demonstrable infection occurred; moreover, in the past history, there was only one instance of a susceptibility to upper respiratory tract infections, and the onset of the disease did not occur with a cold. We cannot, therefore, subscribe to the suggestion of Byfield and Brown that infection of the upper respiratory tract is important as an exciting factor.

The marked irritability, restlessness, sleeplessness, trichotillomania, and definite changes in disposition are symptoms which we are in the habit of associating with a cerebral irritation. The excessive itching of the extremities and the gnawing of the hands, suggest the existence of paraesthesias which have been described in older children. It was striking that gentle stroking of the soles of the feet was sufficient

in three of the five cases to allay the irritation and induce sleep. It is evident, that whatever the irritation of the nervous system, it is of transitory character and does not leave lasting injuries.

Although the five children were examined within a period of five weeks during June and July, the onset occurred between March and May. This is in contrast to the records of the children reported by Byfield. In his series the onset occurred in the majority of cases during the winter months. As the children under our observation came from three different states (Minnesota 2, South Dakota 2, Missouri 1), it is unlikely that local conditions are responsible for the disease, although Byfield described a number of cases seen in and about Iowa City. Local physicians in charge of these children previous to our examination said that they had never seen similar cases.

Note: These cases were studied at the suggestion of Dr. Helmholz, Head of the Section on Pediatrics, Mayo Clinic.

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ACUTE INTESTINAL ILEUS*

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Although during the past ten years very definite advances have been made in the diagnosis and treatment of acute inflammatory processes in the abdomen, and the reduction in mortality commensurately improved, very little progress has been made in the handling of cases of acute intestinal ileus.

Edward Richardson recently published two series of cases, one for a period extending from 1898 to 1907 and the other from 1908 to 1917. For the first series his mortality was 60.4 per cent and for the second 41.5 per cent. This is quite an appreciable reduction in the mortality, to be accounted for by the more prompt interference in the last series in cases where strangulation ileus occurred as a post-operative complication in patients who were still in the hospital.

Codman recently reported a very unusual series of 27 cases, with no operative mortality. This series gives a false impression because it includes several cases of chronic intestinal obstruction from new growths. These should not be confused with acute ileus. Codman accounts for this remarkable series by the fact that he has operated upon a sufficient number of cases so that now he knows how to treat them.

As to the pathology of this condition, there are various mechanical conditions that may produce acute intestinal obstruction. The common ones are known to every one and the literature teems with bizarre and weird cases. These mechanisms we will discuss only in general. The important factor in all cases of acute ileus is the sudden stoppage of the stream of intestinal contents. This may be due to occlusion of the lumen of the bowel, either from the sudden impaction of a foreign body, which is extremely rare, or to constriction or strangulation of a portion of the bowel; in other words, some sudden mechanical obstruction of the lumen. The second type is due to the sudden cessation of the propulsive force, a dynamic or paralytic ileus, from a permanent or prolonged injury to the neuromuscular mechanism of the intestines, as is seen in acute peritonitis or in mesenteric thrombosis.

Surgical therapy is indicated in both types and both types may co-exist in the same patient. When the intestinal lumen becomes occluded the peristaltic effort is increased to overcome the obstruction, and gradually from the accumulation of fluids and gases, in the portion of the bowel oral to the obstruction, this portion of the bowel becomes distended. As a dilated heart loses its contractile force according to the cube of its dilation, so the intestine loses its

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contractility in about the same ratio when it becomes distended. It is easy to conceive, therefore, of the intestine becoming so distended as to permanently lose its power of contraction, causing a paralytic ileus in that portion of the intestine above the obstruction.

With the stoppage of the flow of the intestinal contents a very definite change takes place in the chemical processes in the obstructed portion. A very toxic substance is elaborated and this, if it is absorbed in a sufficient quantity, causes death. There has been a great deal of speculation as to the character of this material and the chemical mechanism by which it is produced. Some time ago Whipple, Stone and Bernheim did some work to prove that this substance was a nitrogenous body formed by the perverted activity of an injured, or in some way changed, intestinal mucosa.

It has been shown that the toxic manifestations of acute ileus are not due to the absorption of substances normally existent in the intestine, but that a definite and new substance is elaborated, also that it is not necessary to have a lesion of the mucosa for the elaboration of this toxic substance, and that microorganisms are necessary for its production. In order to prove this, Dragstedt and his associates made isolated, closed, intestinal loops which they tried to sterilize by thoroughly washing out the lumen with water and ether before they were closed. They found it impossible to produce a sterile condition of the bowel by such a procedure but they did find that the material developed in such isolated loops was less toxic when injected into animals than the material from similar groups not so treated.

The exact nature of this toxic body is not known, but it is known that bacteria are necessary for its production and the organisms found in the obstructed intestine are always of the protein splitting or "B" coli groups. Dragstedt and his associates have shown that the intestinal flora in rats could be modified by feeding them strictly on carbohydrates, so that the predominating organisms would be of the lactic acid type to the exclusion of the coli growth. If in such rats an intestinal obstruction is produced the protein splitting type will develop to the complete exclusion of the lactic acid type.

Whipple, Stone and Bernheim have shown that there is a marked increase in the blood nitrogen in all cases of intestinal obstruction. They take this to mean a nitrogen retention from a renal insufficiency.

Rabinowitch has recently published an article, wherein he states that cases of intestinal obstruction show an increase in blood urea, with an apparently normal or higher than normal output from the kidney, and with a functioning and anatomically normal kidney. These facts lead us to believe that the toxic body is a protein split product. It is important to associate these facts in the interpretation of the symptoms of intestinal obstruction.

One must consider the symptomatology of ileus as a fairly fixed syndrome, and it is on the intensity of these symptoms and their duration that we base the type of operation performed, and not so much on the mechanical conditions that have caused the ileus; in other words, you are not operating on a volvulus or strangulated hernia, but on a case of intestinal obstruction of a certain duration in a known portion of the bowel.

There are very few operations that require any special degree of surgical acumen or judgment after the diagnosis has been made, merely a certain technical ability to do a definite and accepted procedure that has been properly standardized; but the operator who attempts to carry out a finished technical procedure in cases of intestinal obstruction is going to have a very high mortality. I have attempted to standardize in my own mind the technique of these cases, but it is far from satisfactory.

The cardinal symptoms of obstructive ileus are cramp-like or colicky pains. This is the type of pain that occurs with hyperperistalsis of any hollow viscus, such as the ureter, renal pelvis, gall-bladder, and uterus; and the intestinal type is to be differentiated from the others by the diffuse character of the pain which the patient will himself describe as being "in his bowels", and is associated with a feeling that his bowels should move. He will often describe the pain as being similar to the cramp-like pains that follow the taking of a drastic cathartic. It is not unusual to first see the patient with a strang-

ulation ileus straining at stool. The pain is progressive, that is, the remissions of periods of freedom from pain gradually become shorter until the pain is almost continuous. The next most important symptom nearly always present is vomiting. The vomiting is not a toxic manifestation but probably a mechanical one and can only be satisfactorily explained by reversed peristalsis. Almost simultaneously with the onset of complete obstruction, this symptom begins. The following case illustrates very well the fact that this reversed peristalsis is a mechanical and not a toxic feature of the condition, also that the toxic manifestations are due to bacterial growth in the intestine; and if such a thing as sterile intestinal lumen were possible, the toxic features of intestinal obstruction would not be present. Attempts to produce a sterile condition in the intestine have not been successful, but experiments have shown that the toxic features were much less obvious where the number of protein splitting microorganisms could be materially reduced in the intestinal lumen.

Recently this case came to my notice. The patient was a new-born baby, forceps delivery, weight 8 pounds, and immediately after its first nursing vomited milk, and very shortly vomited meconium. This vomiting of meconium persisted and nothing was passed by rectum. Gradually there developed marked distention of the abdomen and a diagnosis of intestinal obstruction was made. A catheter could be passed about two and one-half inches into the rectum but no further. The child was watched for about twenty-four hours and although it vomited constantly and took no fluid, its physical condition was not bad. Between its attacks of vomiting it looked like a normal baby. The pulse was normal and there was apparently no shock. At the end of twenty-four hours a laparotomy was performed and an extensive exploration made which took over an hour. We found that the ileum, instead of emptying into the cecum, ended blindly at the umbilicus; in other words, there was a continuation of the omphalomesenteric duct. The cecum was represented by a small nodule without any lumen. From this point on the large intestine was represented by a narrow cord. An attempt was made to anastomose the distended ileum to a

portion of this colon where there was a small lumen, but the futility of correcting the condition was very soon apparent. The wound was closed and the child died five hours later.

The interesting part of this whole picture was that in spite of a long, rather rough manipulation, the child recovered from the operation and stood it quite well, but died a few hours later, and never once from the time it was born did it show the picture that is usual in the case of complete obstruction of the ileum. I think this is explained by the fact that we had here an unusual condition of acute intestinal obstruction with a sterile condition of the intestinal lumen.

The vomiting in intestinal obstruction usually begins with the onset of the pain. Then there is a remission of this symptom for quite a period after the initial attack, when it again recurs with definite regularity, the intervals between attacks becoming shorter, until the vomiting is almost continuous. The vomitus consists of gastric contents and later of a large amount of bile stained fluid, with evidences of material ejected into the stomach from the small intestine. This material is yellowish, of the consistency of pea soup, and has a peculiar alkaline odor. Although the character of the material does not change a great deal, the odor becomes colonic and often gives the impression of having been ejected from the large bowel. The odor is probably due to the activity of protein splitting ferments in the upper bowel. With these symptoms there may be a bowel movement, which may even be watery in character. Later there may be some passage of blood. After this there is absolute obstipation and no passage of gas, with progressively increasing meteorism. The pulse becomes rapid and the patient sinks into a state of collapse.

In cases of paralytic ileus, such as occur with peritonitis, either general or localized, or with severe trauma, the symptoms of ileus are often masked by those of the exciting condition. There may not be the colicky pain noticed in the obstructive type. In these cases we have the obstructive type of vomiting, gradually becoming more and more severe, with increasing meteorism, upon which to make the diagnosis of ileus. If such a condition is due to general

peritonitis it is probably not worth while to operate, but if it is due to a localized peritonitis it may be important to recognize the factor of ileus. Ileus may occur in cases of appendicitis with abscess formation and quite often it is not a real paralytic ileus but an obstructive type from the kinking of the small intestine where it is adherent to the inflammatory mass.

Handley describes a condition which he calls ileus duplex, in which a loop of intestine becomes obstructed, usually at two points where it is adherent to a pelvic inflammatory mass, the intestine becoming kinked at the oral and abnormal ends of the adherent loop.

In considering the symptomatology of ileus one must keep in mind the fact that the higher the obstruction the more violent are the symptoms and the more rapid the course of the illness. Whenever it is possible in cases of ileus the operative procedure should be performed under local anesthesia. Where there is intestinal vomiting or where large quantities of vomitus are ejected, it is important to thoroughly wash out the stomach before the operation. This serves two purposes; it gives the patient a period of freedom from vomiting, often of sufficient time to permit the surgeon to perform an operation without the annoyance of having the patient vomiting and retching.

If one is fortunate enough to see these cases before the portion of the intestine oral to the strangulation is much distended and the portion of the bowel strangulated has not been permanently injured, relief of the strangulation is all that is necessary. This is especially the case if the obstruction is in the lower part of the ileum. In cases where the symptoms are more violent, especially in vomiting and abdominal distention, if the abdomen is opened and it is found that the strangulated loop reacts after having been released, but that the intestinal wall above the obstruction is thinned out from over-distention and does not empty itself, we then have a condition of paralytic ileus from over-distention, and merely relieving the strangulation will not allow the intestine to empty itself. It is very important in these cases to do an enterostomy as high as possible with two objects in view: first, to empty the intestine of its toxic material, and second, to

relieve the over-distention so that the musculature of the intestine will again be allowed to function, in this way obviating the possibility of a paralytic ileus from over-distention.

It sometimes happens in cases where the intestine is so distended, that in adapting itself to the abdominal cavity it becomes angulated at various points throughout its course. Opening the intestine will often relieve the distention between two such angulations but not beyond that point. If this occurs it is well to use Monk's procedure of threading the intestine over a rigid tube so as to empty as many of these sections as possible before the abdomen is closed. The tube is then sutured into the bowel to establish a temporary enterostomy. This is not an unusual condition and is often a reason for the fact that, although a large caliber tube has been sutured in the intestine, the distention remains and the enterostomy opening does not drain. The best index as to whether such a condition exists is the difficulty in closing the abdomen. If the intestine is thoroughly emptied there should be no difficulty in closing the abdomen. If one attempts to close the abdomen by brute force while the intestine is still distended there is likely to be a persistence of the obstruction, by increasing or making more obvious these angulations, and the trauma to the intestine is very likely to cause an adhesive peritonitis, fixing these angulations with adhesions. Where the strangulated loop is not viable or where there is a suspicion that it may undergo necrosis, that portion of the intestine should be resected; but we make it a rule never to do an anastomosis in acute cases. The suspected loop is lifted from the abdomen, the intestine above it emptied, and an enterostomy tube fixed at a point oral to the strangulated loop, or higher, if possible. The abdomen is then closed, allowing the injured loop to remain outside the abdomen. It is bad practice to bring out a loop with the idea of opening it at some later time. If the intestine is in such a condition as to require resection, there is always sufficient toxic material oral to the injured loop to require immediate relief by enterostomy.

The same principles hold good in the treatment of strangulated hernias. It is interesting

to note that when a right inguinal hernia does contain small intestine it is that portion of the intestine six or eight inches from the ileocecal valve, while the strangulated loop of ileum in a left inguinal hernia is usually a higher one and the symptoms are more severe. The most difficult strangulated hernias are ventral hernias where a high portion of the ileum is caught, and the difficulty of isolating the strangulated loop is often very great. The temptation to do finished surgery with the idea of curing the hernia and not having an enterostomy to complicate the operation, is often great; but such a temptation should be overcome. It is a great deal better to make an enterostomy where it is necessary, through the hernial wound, and repair this with the hernia after the patient has survived his acute ileus.

It is doubtful whether one can do anything for a patient with a paralytic ileus caused by a general peritonitis, but I believe it should be tried for the reason that there is a great likelihood of the condition being a localized peritonitis, which is amenable to treatment, associated with a mechanical ileus caused by angulations from loops adherent in the inflammatory areas. In such cases a rapid jejunostomy done under local anesthesia will often save the patient's life. We have seen several cases of localized peritonitis with abscess formation, in which the predominating symptoms were those of intestinal obstruction. In such cases one should devote his energy, first, to the treatment of the intestinal ileus and, next, to the inflammatory process. To quote the case of a young man twenty-six years of age, who was taken with pain in the abdomen, fever, and vomiting. These symptoms gradually abated, but on the fourth day after his illness his temperature again arose, he began to vomit, and his abdomen became distended. Enemata did not relieve the distention. He was vomiting large quantities of fluid and was in considerable shock. His temperature when we saw him was 100.4° and he was definitely tender in the right lower quadrant. A median incision was made. The small intestine was found to be tremendously distended, purplish in color, and projected from the wound. Exploration revealed a mass which could be felt extending from the region of the

cecum into the pelvis, to which several loops of intestine were adherent. No effort was made to disturb these adhesions, but a tube was introduced into the dilated intestine and the wound closed about it. The mass which could be felt on rectal examination was opened through the rectum. The distention immediately disappeared and the patient made an uninterrupted recovery. About six months later his appendix was removed. I am convinced that any effort made to disentangle this intestinal mass would have resulted in the patient's death. The first operative procedure of draining the abscess through the rectum required less than ten minutes.

More recently a similar case came to our attention in which the predominating symptoms were those of ileus. This patient was over seventy years of age. He had very little pain in his abdomen but extensive meteorism, followed by vomiting. He was quite tender and slightly rigid over his appendix. The abdomen was opened and a partially gangrenous appendix with beginning abscess formation was found. The appendix was removed and a drain inserted into the abdomen. We thought of opening the dilated loop of small intestine, but because of having to work in an infected field we did not like to expose to infection a clean portion of the abdomen. This would have been necessary in order to accomplish this procedure, so it was not done. The symptoms of ileus did not abate and the patient died in a few hours, the typical death of acute intestinal ileus. The proper therapy in this case would have been to open the abdomen at a point distant from the inflammatory process, drain the intestine, and then drain the abscess through a separate wound, without making an effort to remove the appendix.

I do not mean that one should do an enterostomy in every case of appendicitis with abdominal distention and vomiting, but where the cardinal features of the case are those of intestinal obstruction, with the vomiting of large quantities of fluid and extreme abdominal distention, the serious illness is probably not the peritonitis but the intestinal ileus, and the ileus deserves first consideration.

Postoperative treatment of intestinal ileus

is very important. These patients are very much dehydrated from the constant vomiting. This in itself is probably an important factor in the intoxication and for a long time was thought to be the real cause of death, so it is important to give these patients fluids, preferably into a vein and immediately after the operation. It is almost impossible to give too great a quantity at one time, because as soon as the normal blood volume is established, unless the kidney function is impaired, fluid will be excreted almost as rapidly as it enters the circulation. If fluids are given beyond this point the blood volume will remain practically the same and the fluids will go into the tissue spaces and to some degree be excreted into the intestinal lumen.

Three or four years ago Crile did some work on the maintenance of blood volume by the injection of salt solution and found that the fluid was retained in the circulatory system for only a very short time, and that if excessive quantities were injected it went into the tissue spaces and a great deal of it was excreted into the intestinal lumen. On this basis I once injected an excessive quantity of salt solution into the vein of a woman shortly after operating upon her for acute intestinal obstruction, with very startling results. This patient was about sixty-five years of age and had had a strangulated left inguinal hernia of seventy-two hours' duration. Her pulse was extremely rapid and she was in very poor condition. Under local anesthesia I lifted out the strangulated loop, but the intestine was no longer viable, so I opened the bowel and inserted a tube into the injured loop, leaving the intestine outside the body. The distention subsided somewhat but the vomiting persisted and the artificial stoma did not drain. On the basis of what I had seen Crile do with animals, I gave this patient nearly 3 liters of salt solution into the vein. She passed a great deal of urine and very shortly (approximately three hours) fluid began to issue in large quantities from the stoma in the intestine. From that time on she began to pick up and in two weeks she had sufficiently recovered to enable us to close the enterostomy opening and repair the hernia. I presumed the excessive fluid was secreted di-

rectly into the intestinal tract. Experiments done since then on animals have not turned out so satisfactorily.

SUMMARY

(1) Clinical experience substantiates the most recent experimental work done.

(2) The grave symptoms of intestinal ileus are probably due to the activity of protein splitting ferments.

(3) Successful surgery depends upon relieving the ileus as early as possible and postponing any reconstructive surgery for secondary operation.

(4) Large quantities of fluid, given preferably intravenously, diminish the toxemia probably to a degree by being actually excreted into the intestinal tract.

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DISCUSSION

DR. E. E. FARR, Minneapolis: Dr. Zimmerman has covered the main points in relation to this subject, and discussed some of the mooted points which I do not wish to take up. Provided the line of treatment he has given us is to be carried out, there are certain technical points which are always difficult when one of these cases comes to operation. The anesthetic is an important feature in these desperate cases, and we need every artifice that will meet the handicaps under which we are working. Under local anesthesia the technical handicap is greater, as far as carrying out of the operation is concerned, provided we do anything more than an enterostomy. What are we going to do with the cases that are extremely bad? Some are so sick that general anesthesia is out of the question and local anesthesia is demanded. Provided a small loop of non-distended bowel can be picked up, this may lead to the point of obstruction and evisceration may not be necessary. As a rule, however, in these cases the intestines will protrude

as soon as the abdomen is opened. They cannot be held in. These patients should be given preliminary hypodermics of morphin and magnesium sulphate, and the distress produced by the intestines lying outside the abdomen is not marked, provided extremes of temperatures are avoided when placing the packs about them. In these cases we use rubber towels, making the incision through a piece of rubber which is attached to the skin. Beneath this rubber one may place sterile hot water bottles. The intestines are allowed to come out upon the rubber towel, and may be evacuated by drawing a small knuckle of bowel through a one-inch opening in another rubber towel. The contents of the intestines may be aspirated by this means, the purse string tied, and the bowel washed off by pouring salt solution over it, without contaminating the sterile field. The assistant, with hands beneath the second rubber towel, may milk the fluid from the intestines. We sometimes fill the Pneumatic Injector with salt solution, introduce it into a second loop of bowel, and in this way several feet of intestine may be irrigated, getting rid of toxic material. We have had a number of cases recover, though they were cyanotic when they reached the table. In doing an enterostomy we have no hesitation in using catheters for drainage in several separate loops.

DR. A. E. STRACHAUER, Minneapolis: The indications for the evacuation of the bowel content above is well brought out. The fact that the higher the obstruction the more severe the symptoms is also well appreciated. However the higher we go in the intestinal tract the nearer we come to sterile content of the small bowel, so I should rather question the explanation that the symptoms are due to the activity of bacteria.

DR. F. A. DUNSMOOR, Minneapolis: I think this is a paper which calls to mind the seriousness of abdominal obstruction. Some time ago I was visiting the Boston City Hospital, and found that in their reports for obstruction of the bowel although operated upon, all cases approached a 50 per cent mortality. This seemed to be quite surprising and I followed it up in other hospitals I visited. I found that that figure hasn't been changed so very much. Taking the good and bad cases, and for whatever cause, altogether those which have been operated upon have had about 50 per cent mortality. What the doctor has mentioned about emptying thoroughly above the obstruction, I believe should be supplemented. If this bowel did not empty, then open the intestine as high as possible above this and irrigate directly through and out near the obstruction. Then follow up with stimulants. This is one place in which I like to see whiskey put into the inside of the intestinal canal.

Another point is in regard to the administration of fluid which the doctor asks after operation. I believe that if we wish to make this work more satisfactory, we should put that fluid into the patient's veins

before operation. If impossible to put it into the vein put into the tissue or abdomen. I am confident that those procedures are indicated as clearly as any in the practice of surgery.

DR. A. E. BENJAMIN, Minneapolis: I think that the question of the best treatment for acute obstruction of the bowel has not been solved because the mortality rate is too high at the present time. However in these cases which I have diagnosed as acute obstruction, if I could demonstrate that it was single, I have attempted stomach lavage. This is repeated every two or three hours constantly for two, three, four or five days. The results have been remarkable. We wash out the stomach with bicarbonate of soda solution and then emptied the bowel from below. It is surprising what results we can get especially if we can get the patient to retain mineral oil, which will gradually seep down through the intestine. The operation can then be performed and the obstruction relieved. I agree with Dr. Farr that where several loops are found distended, opening up these loops is an advantage, although most of these cases, as desperate as they are, will die. Very few will live. We find that where there is gastric distention there is extreme restlessness that is apparently not due to the obstruction alone. This distention produces pressure upon the heart. There seems to be a toxemia which cannot be entirely explained which produced the poison that has such effect upon the nervous system. These cases you have all seen.

DR. FARR: When do you give the mineral oil?

DR. BENJAMIN: Just as soon as the patient can keep it down.

IMPORTANT POINTS IN DIFFERENTIAL DIAGNOSIS OF GASTRIC ULCER AND CARCINOMA*

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While the literature in this field is limitless, the important phases of gastric ulcer and carcinoma can be summed up in a short paper and I will endeavor to give only the essentials and leave out the multitudinous details with which ulcer and carcinoma are encumbered, in the ordinary text-book handling of the subject.

When a patient presents himself with a supposed gastric lesion, we first verify the presence of a lesion. In a very high percentage of gastric cases the lesion will prove to be ulcer or carcinoma. It is ordinarily quite easy to determine the presence of a lesion but oftentimes

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extremely difficult to say whether it is malignant or nonmalignant.

All cases are put through a definite routine, up to a certain point, which includes an exhaustive history, general physical examination, blood and urinary examinations, and either a one hour or fractional gastric test meal. If the one hour test meal shows any marked deviation *below* the normal the patient is later put through a fractional test. The reason for this is that the one hour test may show a very low secretory activity while a test running every fifteen minutes for two and one half hours to three hours may show a latent secretory power approaching or up to the normal. The curve may start after the one hour period and reach its climax at two hours.

After the stomach has been emptied a barium meal is given and the morphology, tonus, peristalsis and mobility is studied. We find it more convenient to make this examination on the first filling of the stomach and have the patient report back in six hours for a motility check up. It also saves the patient taking two meals. During the barium full stomach study it is determined whether films are necessary, either as a matter of record or to check up suspected areas for defects. Ordinarily we are satisfied with the screen readings and only take films in about one out of four cases. With thick patients and where there is a doubt existing as to the accuracy of the screen reading, the films are necessary.

I will now discuss the essential diagnostic points of gastric ulcer and gastric carcinoma on a differential basis. Gastric ulcer of the acute perforative type is not included as the history, from our experience, is of little value. These statistics are from our own files which include some 500 gastric ulcer and gastric carcinoma cases.

GASTRIC ULCER HISTORY	CARCINOMA
<i>Average age</i> —15 years.	52 years.
<i>Average duration of stomach history</i> —14 years.	3 years.
<i>Sex</i> —Male 74, female 26.	Male 64, female 36.
<i>Attacks</i> —Usually attacks last weeks to months with varying periods of remission, sometimes of years; if complicated may be constant.	Constant.
<i>Pain</i> —Location — Epigastric and pyloric region.	Epigastric, when present.

<i>Time</i> —2 to 5 hours p. c. usually.	Immediately p. c.; 2-5 hours in ulcer type.
<i>Type</i> —Hunger pain, gnawing, occasionally lancinating.	Dull, sickening.
<i>Radiation</i> 0	0
<i>Relieved by</i> —Food, alkalies and vomiting.	Starvation or liquid diet; food and alkalies in ulcer type; vomiting.
<i>Nausea and Vomiting</i> —Frequently 4-5 hours p. c., on empty stomach marked relief.	Frequently the first symptom; very common.
<i>Nutrition</i> —Good until complications; weight loss in attacks with recovery in remissions.	Continued weight loss and later cachexia.
<i>Appetite</i> —Good until complications.	Poor, loss of appetite often first symptom.
<i>Bowels</i> —Usually unaffected or constipated if on bland diet.	Often achylic diarrhea.
<i>Hemorrhage</i> —40 per cent.	18.7 per cent.
<i>Occult blood</i> (gastric)—35 per cent.	60 per cent.
<i>Total acids</i> —70 points.	30 points.
<i>Microscopic</i> —Sarcinae in 90 per cent of retention cases.	Oppler-Boas in 60 per cent.

Roentgen Ray Study of Gastric Ulcer.

1. Visualization of a niche, occasionally with incisure in same circular muscle zone, more often without.

2. Accessory pocket of chronic penetrating ulcer, very often with hour glass stomach.

3. A flat board-like line of stomach contour which is skipped by peristaltic wave as occasionally seen in large flat saddle ulcers.

Usually the roentgen ray hunt for gastric ulcer resolves itself into a search for a break or defect in the contour of the stomach wall. As we are looking at a silhouette, the patient must be rotated so that each sector of the stomach wall will be tangential.

It is impossible by the roentgen ray or any other method to determine when an ulcer is undergoing malignant degeneration. We have had a number of cases explored and stomach resections done where the surgeon could not answer this question from the gross pathology of the specimen. The pathologist made the diagnosis.

Roentgen Ray Study in Gastric Carcinoma—For the purpose of this paper I will classify gastric carcinoma into two types only.

1. Ulcers that undergo malignant degeneration.

2. Primary carcinoma.

1. Carcinomata that evidently developed from an ulcer base have already been discussed under ulcer. In the later stages of this type the roentgenray findings are the same as in those called primary carcinomas.

2. Primary carcinoma is demonstrated with roentgen ray by a filling defect in the contour of the stomach wall which is diametrically opposed to the niche of an ulcer, that is, the niche adds to the stomach map while a filling defect takes away. The lines or margins of a filling defect of carcinoma are usually characteristic, being of moth-eaten or finger-print character. This is what one would expect from the usual mode of carcinoma proliferation.

In earlier cases where the growth has not impinged on the lumen of the stomach and is only involving the wall, a condition similar to that obtaining in saddle ulcer is found, that is, a board-like section of wall which is skipped by peristalsis.

The filling defect of medullary carcinoma is found in all stages of development from a nodule the size of a pea up to the tremendous defects reducing the stomach map to less than half its normal area.

To illustrate some of the difficulties in the differentiation of gastric ulcer from carcinoma I wish to cite, in brief, four histories, and will give only the very essential points.

Case I. Male, aged 59, Russian Jew. Examined August 1916.

History: For ten years he had attacks of pressure pain under the ensiform radiating to the back under both scapula, lasting two or three months, coming on twice a year (usually in spring and fall). Pain in the attacks came on two hours after eating and lasted for a few minutes at a time until the next meal, with food and soda relief. The pain was always localized under the ensiform, never in the abdomen. He was slightly constipated. Five years before present trouble started, that is fifteen years ago, for nearly a year he suffered from attacks of severe crampy pains under the right costal margin, lasting a few hours. Weight 115—normal 135. Physical examination was negative except for spastic upper recti. Blood negative. Urine negative except for two and one-half per cent sugar in first specimen, never found again on repeated examinations—no blood sugar examination made. Three stools examined for occult blood two days apart, all negative. Gastric analysis: total acidity 6, free HCl—combined acidity 6; no food remnants; microscopic examination negative. Roentgen ray examination: large hy-

potonic stomach, subnormal peristalsis, regular cap, deep incusura in greater curvature of media, opposite an area on lesser curvature which seemed board-like and which peristalsis skipped. One fourth of the meal was still in the stomach in six hours. Saturated with belladonna for two days and reexamined with same findings.

Diagnosis: Carcinoma or ulcer of lesser curvature of media, and gall stones. Operation advised but definitely refused.

The patient was put on ulcer management and remained symptom free for four years. Then he had a recurrence of the symptoms and returned for examination. Our findings were practically the same except that a definite niche was seen on the lesser curvature opposite the incisura at the point where the boardy wall was noted at first examination.

In reporting to his physician he was again recommended for operation and as symptoms did not subside under management he submitted. On opening the abdomen an inoperable carcinoma of the lesser curvature with glandular involvement and a gall bladder full of stones was found.

Comment: By all the rules of the game this man should have had a carcinoma at the time of first examination but evidently it was still an ulcer at that time but four years later became malignant.

Case II. Male, aged 68. Weight loss thirty-five pounds in two years. Two and one-half years ago he started to have attacks of gassy, crampy, hungry distress in epigastrium coming on one hour after eating and at night. Distress was constant since onset with no variation. He was worse the first year, before he found he could get complete relief in five minutes by taking food or soda with relief lasting one to two hours. Pain would awaken him three or four times during the night after midnight and he would take a drink of soda water with great relief.

For the last one and a half years his bowels have been loose and watery. No vomiting or tarry stools. No palpable abdominal tumor. Urine, considerable albumin and a few casts. Blood: Hb. 65, R. B. C. 3,920,000, W. B. C. 11,000. Differential count negative. Stomach analysis: one hour return, total acids 60, free HCl 20, combined acidity 40. Large amount of delayed food remnants. Strong occult blood test. Stomach analysis (fractional): no acidities up to one and one fourth hours at which time total acidity was 60, free HCl 20, combined acidity 40. In two hours had total acidity 72, free HCl 28, combined acidity 44. Occult blood constant, no lactic acid.

Roentgen ray: Very large atonic stomach with vigorous peristalsis and freely mobile. A small crater or filling defect on lesser curvature near pyloric ring and very definite tenderness. Almost complete obstruction as no appreciable amount of meal passed through in six hours. Reexamination after belladonna up to physiological effect produced no change.

Diagnosis: Ulcer or carcinoma of lesser curvature near pyloric ring with high grade pyloric obstruction.

Gastro-enterostomy with resection later if considered necessary, was advised.

Surgical findings: Ulcer or carcinoma of the lesser curvature of the pars pylorica.

Pathological findings: Ulcer with malignant base.

Comment: In this case it was impossible for either the diagnostician or surgeon on exploration to state whether the condition was malignant or non-malignant.

Case III. Female, aged 43. Four years before, ulcer near pylorus resected.

History: For ten years, attacks of growling, nauseating distress localized at navel, lasting three to four weeks with remissions about the same. Bad taste in mouth like medicine. Vomits frequently in attacks but never any blood. No tarry stools. Diarrhea constantly for several years and a great deal of gas in bowels. Normal weight 130, now 120. Four years ago had an ulcer near pylorica of stomach resected but did not get much relief. Distress has always been irregular in relation to food.

Examination: Urine and blood negative. Stomach analysis: total acidity 26, free HCl 8, combined acids 18; food remnants present; occult blood test negative.

Roentgen ray examination: Normal tone and size but tied down and deformed in pylorica probably from operation. Rest No. 2 in six hours. Reexamination after belladonna, no change.

On account of operative history we did not feel like suggesting further surgery at this time and she was given dietary advice.

Patient came back for examination one year later. Weight and symptoms were about the same but the roentgen ray showed a change in the pyloric condition and a greater degree of immobility, more deformity and a suspicion of a mass in this location. Exploration was advised but refused at this time.

Six months later she submitted to exploration and a carcinomatous mass the size of an egg was found at the site of the old scar on the stomach, with involvement of the glands of the lesser curvature.

Comment: This woman developed a carcinoma at the site of an ulcer resected 5 years before. With a misleading history and a stomach deformed from the first operation it was difficult to make a diagnosis.

Case IV. Male, aged 54, laborer. Gradual weight loss of fifteen pounds in three years.

History: Attacks of stomach trouble had occurred for three years. For the first two years, attacks of severe doubling, gassy, epigastric pain appeared about once every two months, coming on at 4 p. m. and lasting eight hours. They always came on a Sunday or holiday, that is, on a day when he was not working. For the last year, attacks have been daily, described as a grabbing epigastric pain relieved

by belching and by vomiting a half cupful of sour bitter, yellowish fluid two hours after eating. Never any food returned. Very constipated and stools of fragmentary, burned type. He was a heavy user of snuff which aggravated distress as did also acids.

General physical examination: Several abscessed teeth. Tender point in upper right abdomen. Cachectic color, very suspicious of a severe blood disturbance or malignancy. Urine, negative. Wassermann negative. Blood: Hb. 65, R. B. C. 3,860,000, R. B. C. 10,100, differential normal. Stools negative. Gastric analysis: total acidity 44, free HCl 36, combined acidity 8; much mucus, no occult blood. Roentgen examination of stomach negative.

One could not make a definite diagnosis but on account of his cachexia and history a notation was made "possible malignancy". He was put on a careful diet and alkalies, and kept under observation for two months. He immediately became symptom free, his color returned to normal and he was lost track of for over three years. Three years later he returned stating that he had been perfectly well up to a few months ago when he met with a crushing injury to the chest. His stomach symptoms returned at this time and he was unable to control them with diet and alkalies.

His appearance was about the same as three years before, being very cachectic. His weight and subcutaneous fat were normal. Blood Hb. 55, R. B. C. 3,360,000. Gastric analysis: total acidity 66, free HCl 44, combined acidity 22. Roentgen ray examination showed a small pyloric lesion and delayed motility. On account of these findings and the fact that his symptoms could not be controlled by management we advised exploration which was refused. We did not feel at this time that we were dealing with a carcinoma but did feel that the case was surgical rather than medical. On his refusal of exploration we declined to assume further responsibility in his case and did not see him again for three months at which time he came in and from the change in appearance of the pyloric lesion and constant strong reaction for occult blood in the stools, we considered his condition malignant and again urged exploration which he flatly refused.

At this time his weight was above what it had been three years before. No diminution in subcutaneous fat and his acids were high. He was explored four months later and an inoperable carcinoma of the pylorus found.

Comment: This man went through an almost identical cycle nearly four years before, recovered and remained apparently well for three years. On his first examination we were suspicious of malignancy but could get no corroborative evidence. He evidently did not have a malignancy at that time but developed it three years later.

These four cases demonstrate how difficult it is in certain cases to make a positive diagnosis

and while the larger number of patients can be given a definite answer we are constantly being confronted with these problems.

One point I have failed to bring out and that we have found to be of considerable value, is the stool examination for occult blood. Its constant presence on meat free diet, with head, face and lower bowel foci excluded, usually means an open lesion in the upper tract. This constant presence demands of us a continued search until a satisfactory explanation is reached.

I am firmly of the opinion that there is no possibility at present of making an early diagnosis of cancer of the stomach. They are nearly always far advanced before they give symptoms sufficient to warrant seeking medical advice. Fortunate indeed is the individual with a carcinoma of the stomach who gets an early pyloric obstruction by reason of the growth choosing the pylorus as its site.

In summing up I would say that in a large majority of stomach cases, by the time the symptoms appear the different elements that go to make a diagnosis are, in order of their relative value,

- Roentgen Ray,
- History,
- Physical examination,
- Gastric analysis,
- Stool analysis,
- Other laboratory findings, (blood, etc.).

REFERRED PAIN IN HEART DISEASE*

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To one who is dealing largely with the cardiopath the symptom of pain is a not uncommon sign, occurring in a variety of cardiac conditions, not necessarily associated with diseases of the aorta or coronary arteries.

Since the time when Sir John Hunter gave his memorable description of his own agony in angina pectoris, so much has been written on this subject that the profession generally has come to regard pains in this locality as characteristic of aortic or coronary disease.

But if, in a given case, it seems reasonably probable that there is no aortic or coronary disease, then, pains in the left chest, top of shoulder, arm or hand are considered of minor import and variously diagnosed as intercostal neuralgia, muscular rheumatism, or neuritis.

Apparently, the part that valvular and myocardial disease may play in the production of pains quite similar to those of angina pectoris has not been sufficiently appreciated.

The text books spend considerable time describing the character of pain and paths of radiation in angina pectoris, but give scant mention to pain in heart disease.

Recently, however, S. Calvin Smith reports that precordial distress or pain was present in 77 per cent of young men rejected from the draft for myocardial change.

Sir Clifford Allbutt believes that the pain in angina pectoris is due to a stretching of the aorta, in the presence of aortitis; that the inflammatory process in the aorta must penetrate to the outer coverings before the aorta is capable of painful stretching; and, furthermore, that syphilis, rheumatic fever, and influenza, are the chief toxic agents causing inflammation in the aorta.

If, then, stretching of the aorta in aortitis can produce the pain of angina pectoris, is it not reasonable to suppose that stretching of the myocardium can produce pain in myocarditis? In the latter case the stretching may take the form of an over-strain or overload of the heart. But in both cases, infection, apparently, is the predisposing factor, otherwise the normal tonicity of the normal tissues would not permit stretching.

In valvular disease and myocarditis the heart muscle is not normal. *During and after every acute infectious process the heart muscle likewise is not normal.* It may return to normal if the infection has been mild or of short duration or scars may be permanently left in the myocardium by the replacement of muscle fibres with fibrous tissue.

We may readily surmise then, that every infection we survive is capable of taking something out of our myocardiums, manifested by a reduction of cardiac reserve force (which normally is very large) until the time comes

*Presented before the Minnesota State Medical Association, Duluth, Minn., August, 1921.

when this reserve force is so reduced that overstrain or overloading of the heart is easily accomplished.

One of the frequent signs of cardiac overstrain is pain. This pain is not in the heart, for the heart itself is insensative to pain, but is a referred pain located in the skin or muscle of the left chest, shoulder, arm and hand.

How this pain is produced and why it is referred to regions so remote from the heart is a problem that will need a little excursion into the early biological development of the vertebrate organism and the embryological alterations in the relative positions of the various body parts.

MECHANISM OF PREDUCTION OF REFERRED PAIN

There are two nervous systems in the body, the sympathetic and the cerebrospinal, serving different purposes and yet intimately connected.

Of the cerebrospinal we know most because by reason of its functions of sensation and motion it is open to investigation.

Of the sympathetic we are learning more, but there is yet much to know. Some of the facts that have been acquired are in the nature of surmises, because the exact nerve connection between the sympathetic and cerebrospinal systems is difficult of proof.

In the early development of the animal organism, the sympathetic nervous system appeared after the primitive digestive tube, the rudimentary circulatory system and the respiratory systems had been formed, in order to coordinate the function of these viscera. As the organism became more highly specialized, it shed its hard, insensitive outer covering, grew arms and legs and the softer outer body wall was rendered sensitive.

Thus we have the development of the sensori-muscular system subserving sensation and motion. Later the faculty of perception of pain and the location of the painful stimuli on the body surface developed and the cerebrospinal nervous system was thus complete.

It is evident then that pain was originally a protective reflex, and it is probable that the protective character still persists.

If a painful stimuli arose on the external body covering, the whole organism could remove itself from the offending neighborhood or

if only an extremity were involved this alone could be withdrawn and thus only a few muscles need be involved in the act of protection.

Thus far we have been dealing only with the mechanism of protection of the organism from danger from without. How about danger from within the organism itself, such as disease or mal-function of any of its viscera?

As has been shown, the sympathetic nervous system was formed to coordinate the functions of the viscera, and the cerebrospinal system to furnish protection from without through its sensori-motor system. Now, by connecting these two systems, the muscles of the external body wall can contract on receipt of stimuli from the viscera and protect the viscera.

In health there is a constant stream of *afferent* impulses coming from the viscera along the sympathetic fibres to the central nervous system. These *afferent* impulses serve to coordinate all the functions of the body, maintain proper muscle tonus, proper blood supply, etc., and in health we are totally unconscious of these impulses.

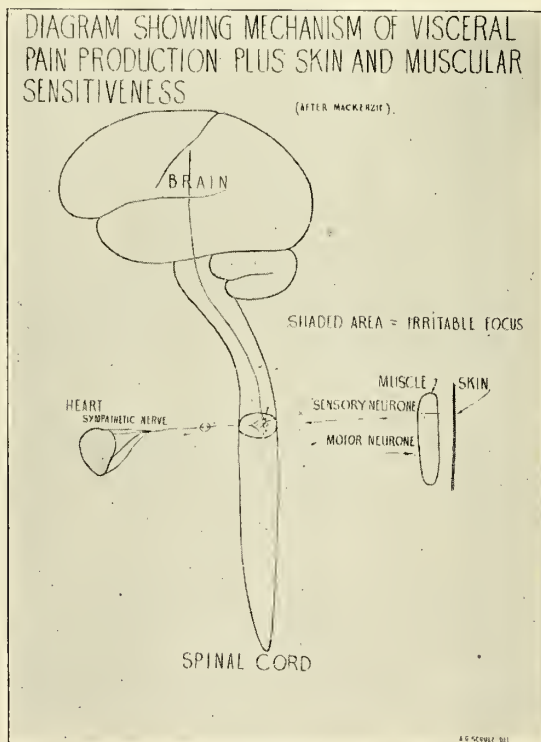


Figure 1

But in disease, when an organ is inflamed or stretched, or its shape or position is altered,

then excessive stimuli flow along the *afferent* nerves to the spinal cord and we become conscious of disagreeable sensations, varying with the degree of stimuli from mild pain to intense agony. As long as the condition of the organ remains altered, so long will excessive stimuli be received in the spinal cord. After a time, from repeated excessive stimulation, these spinal centers become hyperirritable and may irritate the contiguous nerve centers, stimulating them to their respective functions.

Since it is presumptive, from clinical experience, that the sympathetic centers lie in close proximity to the sensory and motor centers in the spinal cord it is easy to see how these sensory and motor centers are stimulated. And, since a sensory or motor nerve can only respond by its specific function when stimulated anywhere along its course, so when these sensory or motor centers in the spinal cord are irritated by the hyperirritability of the surrounding *afferent* sympathetic centers, these sensory and motor centers respond with sensation or motion respectively and refer the impulses to their peripheral distribution in the external body covering, resulting in superficial pain or tenderness or muscular contraction in these areas. As long as the spinal centers are irritable, so long will there be manifestations in the external body wall. Even after the pain is gone, skin and muscular soreness or "hyperalgesia" may persist for weeks. Pain too may be revived more readily than at first because the nerve paths are plastic and the threshold of stimulus has been lowered so that lesser stimuli may suffice to produce pain than were at first required.

Since the sympathetic nerves supplying the viscera, issue from the cord with the cerebrospinal nerves supplying the body wall over the viscera, we have only to know the origin of the sympathetic nerve to any organ to know what sensory and motor symptoms will develop when these segments are stimulated. But whereas in the primitive vertebrate, the cerebrospinal nerves were segmentally arranged around the body and the respective nerves supplied the skin over the viscera, in the higher vertebrate (i. e., man) with the development of arms and legs, segments of nerves were used to

supply these extremities and the cutaneous nerve supply is no longer simple and orderly.

Also, in the development of the heart, in the early fetal life the auricles lie below the ventricles, only later coming to their final position above the heart. Undoubtedly the auricular nerve supply is determined by the primitive position and that accounts for the fact that these nerves come from segments below those going to the ventricles.

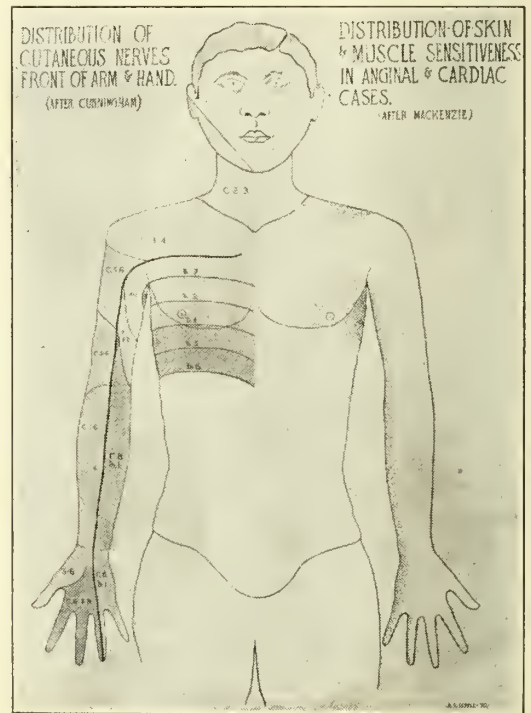


Figure 2

According to Head, who has done more than anyone else to explain this intricate problem, the sympathetic nerves to the *auricles* come from the fifth, sixth, seventh and eighth thoracic segments whose cerebrospinal segments are distributed to the lower axilla and lower thorax front and back. The *ventricles* are innervated by the sympathetic fibres from the second to fifth thoracic segments, their cerebrospinal segments being distributed to the chest from the level of the second to seventh ribs and inner (ulnar) side of upper arm, forearm and hand.

The *ascending aorta* receives its sympathetic innervation from the third and fourth cervical segments with perhaps some involvement of

the first, second or third thoracic cerebrospinal segments, which are distributed in the first case to the base of the neck and top of the shoulder and in the latter case lower on the thorax and down the inside of the arm.

The *transverse arch* receives its sympathetic nerve supply from the fourth cervical, whose cerebrospinal segments go to the laryngeal areas of the neck.

The *descending aorta* receives sympathetic fibres from the second to twelfth thoracic segments, chiefly from the fourth thoracic downwards, whose cerebrospinal segments are distributed to the chest and upper part of abdomen.

Finally the *pulmonary artery* receives its sympathetic fibres from the fifth to the eighth cervical segments, whose cerebrospinal distribution is to the outer part of the arm, forearm and hand.

These borders are only approximate and undoubtedly overlap; also the nerve supply to each portion may overlap, but the figures and areas are sufficiently accurate for us to go by clinically.

It is easy to understand then, that a painful area in the chest wall, in the region of the nipple, may be a reflex from the ventricle and may indicate a cardiac overstrain rather than an intercostal neuralgia.

Reflex pain is common in myocarditis, in myocardial insufficiency and the beginning myocardial degenerations of early middle life. It is uncommon in mitral regurgitation, not infrequent in mitral stenosis but is most frequent in aortic regurgitation of all of the valvular lesions, perhaps because of the often associated stretching of the aorta, as well as to the load on the ventricle itself.

In young people pain is usually associated with acute infections such as rheumatic fever or influenza, or with chronic sepsis such as some focus of infection on the body, very frequently recurrent tonsillitis. It is particularly associated with the acute overstrains, where supreme exertion in the presence of infection, brings it on; it may likewise occur without infection where the myocardium is diseased or degenerated.

Why it is rarely present in chronic dilata-

tions such as occur in chronic mitral insufficiency, is explainable on the grounds of muscle tonicity and stretching, mentioned earlier, in explaining the pain in angina pectoris as caused by stretching of the inflamed aorta. As long as the muscle is tonic and resists stretching, pain will result, or if the stretching is applied suddenly, pain will result, but when the stretching is applied slowly, or the tonicity is low, the muscle yields gradually and pain may not appear.

It is difficult to differentiate entirely the pain of angina pectoris from the pain of cardiac overstrain, but the main points of difference are, that the pain in angina is more apt to come in sudden, arresting attacks, to be brought on by exertion or excitement and to have, as a rule, its seat in the upper sternum from which it radiates to arm and hand and perhaps to leave the chest or arm sore for a few days after the attack. The pain in myocardial disease is more of a dull depressing continuous ache, and is located in the precordium (that is in the region of the apex of the heart) rather than under the sternum. Though it may occur in acute spasmodic attacks with pains down the arm, it is much more likely to persist and may last for weeks or months. In addition, in myocardial overstrain usually skin and muscular tenderness or hyperalgesia is present as long as the overstrain exists.

TO RECAPITULATE

1. Pain is a frequent finding in heart disease independent of angina pectoris.

2. Pain is a warning signal of an improperly functioning organ and in this sense is a protective reflex.

3. Pain is not felt in the heart but is a referred pain, through the *afferent* sympathetic fibres from the heart to the spinal cord and out along the contiguous sensory and motor spinal nerves.

4. The distribution of the contiguous sensory and motor segments is to the body wall of neck, should, chest, arm and hand.

5. Constant *afferent* stimuli to the spinal cord may cause an area of hyperirritability in the cord constantly stimulating sensory and motor segments. There result areas of pain and tenderness in skin and body wall which

are frequently diagnosed as intercostal neuralgia, muscular rheumatism or neuritis. These pains are protests from "an overworked, engorged, inflamed, underfed or decaying heart."

6. Pain similar to angina pectoris may arise from the heart rather than the aorta; consequently all pains in these areas demand investigation of the cardiac function.

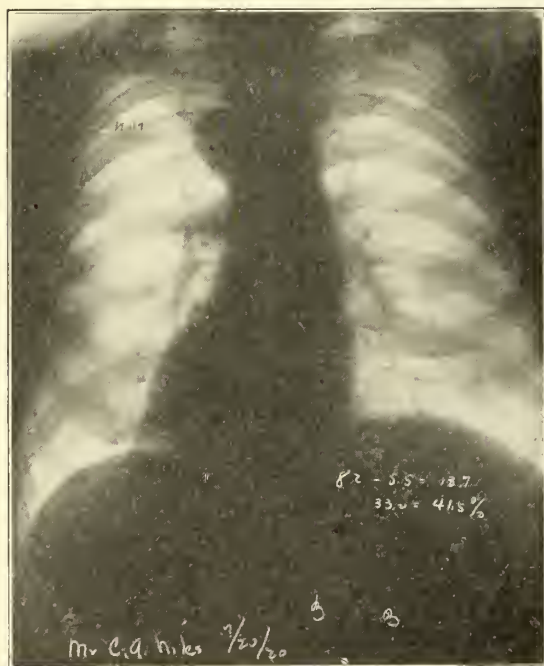
7. If the result of the cardiac examination is doubtful, treatment of a laboring heart will often bring relief.

In conclusion I wish to express my obligation to the works of Sir James Mackenzie, Sir Clifford Allbutt, Sir William Osler, Dr. A. D. Hirschfelder, Dr. Thomas Lewis, Dr. Charles L. Greene and Dr. S. Calvin Smith, which I have consulted freely.

These lantern slides show different types of hearts in which referred pains occurred.

Case I. Mr. N., age 65, clerk in store (formerly horse trainer) came in 1920 complaining of pains in both arms and in left breast, plus dyspnea and edema. Three years ago he had to give up life work of horse training because of pains in left breast and arm and has had pains more or less since.

Examination: Indefinite apical first tone, basal tones weak; no murmurs; rythm regular. B. P. 136/80. Wassermann negative. X-ray heart M.R.5.5., M.L.8.2. diameter 13.7cm. (41% of chest diameter). Marked arteriosclerotic kink to aortic arch.

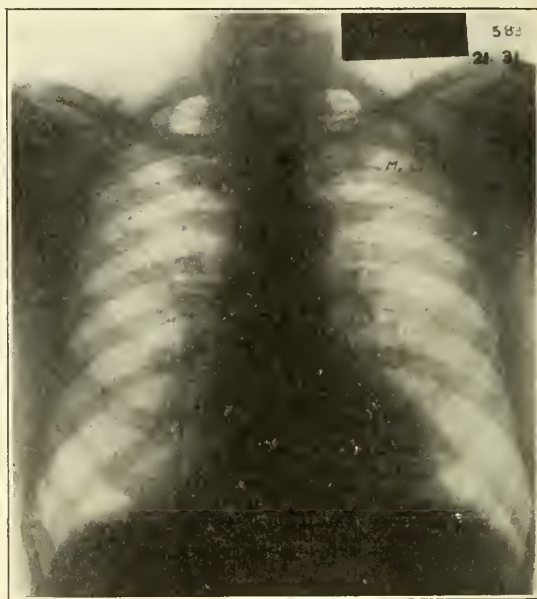


Case I

Under cardiac treatment, dyspnea and edema disappeared as well as right arm pain. Left arm and left breast pain still persists although to a less degree. Recently had pain in the muscles of the left side of the neck and external ear; under more rest and digitalis the pain in the neck and ear disappeared. Undoubtedly this pain in the neck and ear is an evidence of extension of cord irritability upwards as well as to the contiguous centers on the same level.

Case II. Mr. L., age 57, brick-layer, came in January 1921, complaining of pain in the breast on exertion—no pain if sits still.

Onset: Summer 1920 had to climb seven flights of stairs daily to go to work. Noticed that he would get pains in breast radiating to left shoulder, arm and fingers. No work since September 1920. Pain now under sternum, brought on by excitement, hurry, lifting, climbing stairs, etc. Slow recovery from "flu" two years ago, otherwise well.

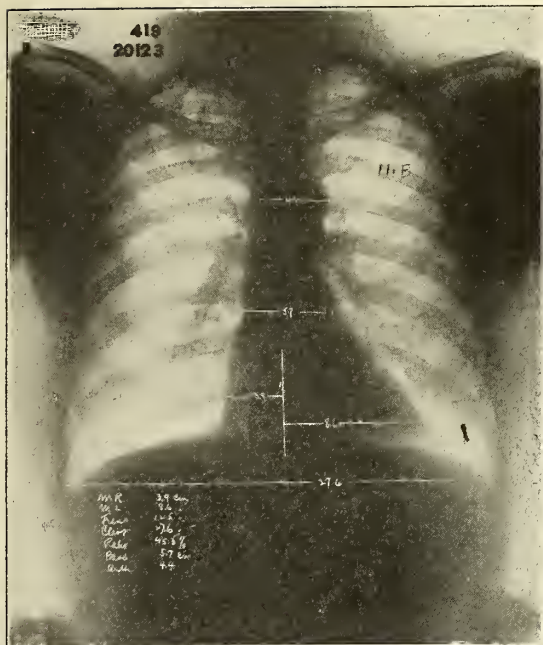


Case II

Examination: Heart slightly enlarged to left; rate moderate; rythm regular; a blurred apical first tone; systolic and diastolic murmurs at the base; no edema; Wassermann four plus positive; B. P. 164/64. X-ray heart M.R.5.3., M.L.9.5., diameter 14.8cm. (47% of chest diameter); no dilatation of the aorta.

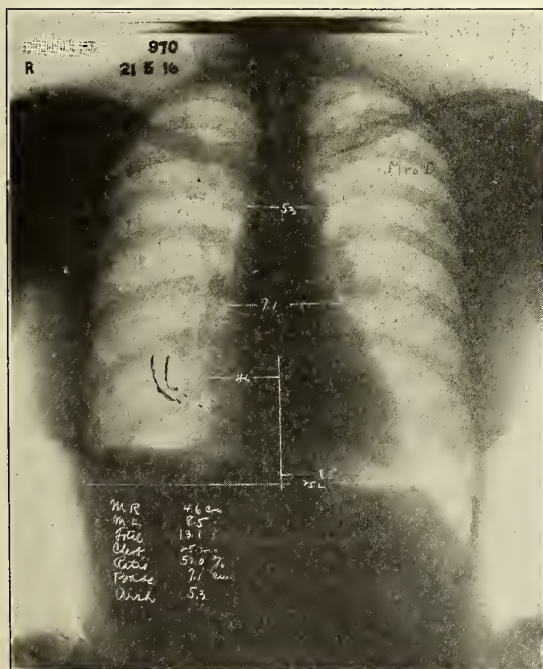
This man made great improvement while in hospital under cardiac and specific treatment, walking four blocks on his discharge without pain.

Case III. Mr. B., age 63, retired farmer, complaining of pain under tip of breast bone with exertion, for thirty years. During the past two years several attacks with extreme exertion, which put him to bed. Now pains come in pit of stomach "grip like a fist" so he must stop and rest; between times comfortable; pneumonia 25 years ago; no alcohol; no tobacco.



Case III

Examination: Heart of small outline; soft systolic murmur at apex; basal tones indefinite; occasional extra-systole; B.P. 154/0. The following day a faint diastolic murmur was heard at second and third left interspaces (due to stretching of aortic ring.) This stretching accounts for the pain on exertion; sclerosis of arteries; Wassermann not made. X-ray heart M.R. 3.9., M.L. 8.6., diameter 12.5cm. Chest diameter 27.6cm.; heart ratio 45.3%.



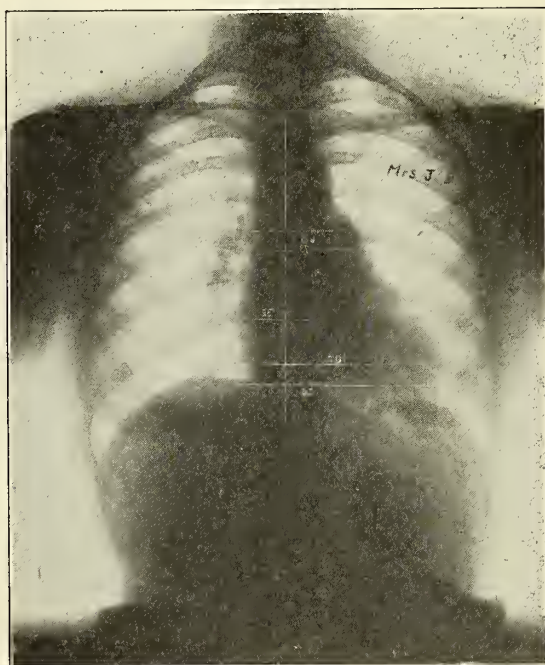
Case IV

Case IV. Mrs. E. S. D., age 55, complaining of pains in chest and back for six months, lack of endurance; left intercostal neuralgia for years; tenderness in region sixth dorsal vertebra; conscious of heart fluttering; twinges of pain in precordium.

Examination: Harsh apical systolic murmur transmitted towards axilla; rate 96; rythm regular; blood pressure 180/80.

Under rest and digitalis, tenderness in region of sixth vertebra disappeared, also intercostal neuralgia; blood pressure 145/80 after five days, finally down to 120/80. X-ray M.R. 4.6., M.L. 8.5., diameter 13.1cm.; chest diameter 25.2cm.; heart ratio 52.0%.

This case is a typical example of the substandard individual the so called "congenital asthmatic" whose myocardium is of poor tonus and easily strainable on exertion, producing referred pains.



Case V

Case V. Mrs. E. J., age 33, complaining of pains in left shoulder; fatigue; lack of endurance; had a "cold" recently since when above symptoms; four years ago acute toxic myocardial insufficiency; tonsillectomy; and well until now.

Examination: Heart enlarged to left with an indefinite apical first tone and a splitting of the second tone at the third left interspace which becomes a diastolic murmur on exertion; rate 72; rythm regular; tenderness in left breast and arm; blood pressure 140/80. X-ray M.R.3.2., M.L.10.2., diameter 13.4cm.; chest diameter 26cm.; heart ratio 51%.

Pain gradually disappeared under cardiac treatment. The appearance of the basal diastolic (aortic) murrmur on exertion is an index of the strainability of this heart and seems to account for the referred pains.

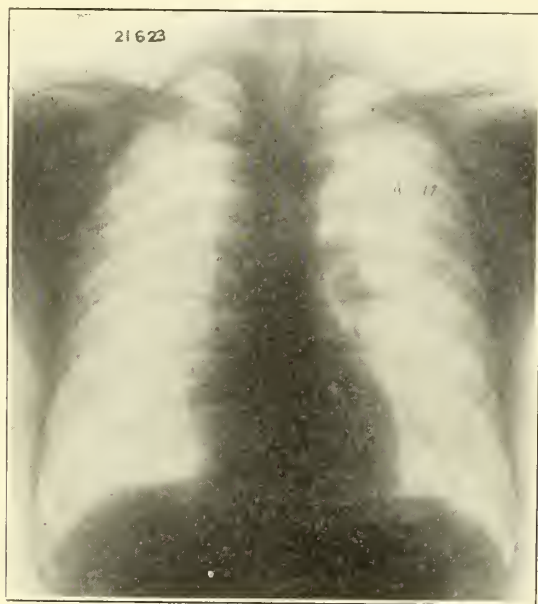
Case VI. Mr. Bernard A., age 22, grocers clerk, complaining of fatigue; weakness in left arm; pain in left chest muscles. An acute overstrain in four years ago while shoveling coal; got lighter work and fairly well till now; tonsillitis frequently; "Flu" three years ago—quite sick—never quite got strength back although O. K. unless overworked.

Examination: Systolic murmur at apex; diastolic to base; capillary pulse in lips; rate 80; rythm regular; blood pressure 140/70; Wassermann negative.

Bed and tonsillectomy. Pains gone; diastolic murmur louder at base.

X-ray heart M.R.5.7., M.L.8.0., diameter 13.7; chest diameter 29.7cm.; heart ratio 46%.

This case shows the effect of strain in the presence of infection as a causative factor in producing referred pains. Note the widening of the aorta.



Case VI

DISCUSSION

DR. E. L. TUOHY, Duluth: Dr. Hensel deserves a great deal of credit for following up the original teaching or writing of MacKenzie, and placing for us on paper some of the criteria by which we may more clearly differentiate chest pains. That diseases in the heart may give rise to pain is, of course, self evident. As I looked at Dr. Hensel's slides I was interested in noting that there was in most of the cases associated organic disease of the heart. My own findings from a fairly large experience has been just that: associated with pain that we might assume to be of cardiac origin there was other evidence of cardiac disease. Insofar as we depart from that statement we run into the usual danger that is likely to follow where pain is interpreted as an isolated phenomenon,—whether pain in the head is indicative of tumor, or pain in the right lower quadrant is coming from the

appendix. We must accept Dr. Hensel's statement that anyone coming with an acute illness or infection may show evidences in the entire heart musculature of weakness or strain. But in addition to pain we should look for other cardiac evidences, such as dyspnea and signs such as you get with the stethoscope.

In judging pain in any part of the body we must consider another feature brought out by him, namely the individual threshold to pain. On individual may have pain and another with similar and far advanced disease, will have no pain. An individual with carcinoma involving the pancreas, with metastases in the liver, may have no pain whatever and some one else with nothing but a gastric neurosis may have much pain.

I think Dr. Hensel is to be congratulated for having brought out these facts regarding pain, showing its distribution, and the only word of warning I wish to sound is that we should be guarded against interpreting this pain as an isolated phenomena, for the literature on almost any subject shows the danger that may result from such procedure, whether it be a pain coming from the pelvic organs, a headache that is supposed to be always due to the sinuses, or a cardiac pain that we think is always due to the focal infection, and for which so many people are losing their tonsils and teeth. We must remember that our information must dovetail, that it must not be forced, and that we must give due credit to the conviction that pain can arise from the heart that is under strain, and, as has been shown, particularly when the aorta is involved.

REPORT OF AN EPIDEMIC OF PARATYPHOID FEVER AMONG UNIVERSITY STUDENTS*

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Epidemics of paratyphoid fever have been considered uncommon enough to give great interest to the observation of the disease and its report. However, paratyphoid fever was not uncommon in the allied armies during the World War. Martin and Upjohn¹ report 5,700 cases of enteric fever at Gallipoli of which 93 per cent were paratyphoid and only 7 per cent typhoid. In a study by Hunt² of four water borne epidemics in Pennsylvania, in 1911, out of a total number of 509 cases 117 presented atypical features and of these about 50 per cent were typhoid. Miller³ thinks that a care-

*Presented before the Minnesota State Medical Association, Duluth, Minn., August 1921.

ful investigation of other epidemics would show relative frequency of paratyphoid.

In this epidemic occurring in a community in which typhoid fever is rare, in a selected group of individuals of approximately the same age and a majority of the same sex, added interest accrues to the features and characteristics of the disease.

The material for this report has been obtained from the records of 52 cases among students of the University of Minnesota who were hospitalized by the Students' Health Service. In addition to these, nearly as great a number were treated elsewhere in the city and state, making a total of approximately 106 cases. Of the 52 cases here reported 48 were men and 4 were women. This discrepancy, as will be mentioned later, is due to the fact that very few women students ate at the place where the infection occurred. The age varied from 16 to 42 and averaged about 22 years.

Some clinical features were of very marked interest. The onset of illness, in most cases from March 14 to March 19, 1921, usually quite abrupt, was marked with headache, backache, malaise, and anorrexia; rigor was occasionally observed.

Severe headache was very common. In but half of the cases were symptoms referable to the gastro-intestinal tract present; these were chiefly diarrhea, nausea, and vomiting, occasionally associated with abdominal tenderness and cramps. A very few cases were observed with symptoms of acute upper respiratory infection. Epistaxis was present in a few cases. Joint and back pains were prominent. Fewer cases presented more gradual onset without much diarrhea and were less severe in their course. The early occurrence of herpes about the lips in the disease was an interesting and frequent feature. Examination of the chest during the first week was negative except in four cases where the signs of a diffuse bronchitis were present. The heart showed an increased area of dullness in three cases and in nine a systolic murmur was heard at sometime in the course of the disease. A dicrotic pulse was noticed in a small percentage of the cases. The abdomen, in a few cases, presented signs that were difficult of interpretation. Abdom-

inal tenderness, with distention, was noticed in 8 cases. In 3 this was maximum in the right lower quadrant and was associated with rigidity. One case especially, in the second week of the disease, showed signs of a local peritonitis in the region of the appendix. Operative procedures were not deemed advisable and recovery was uneventful. One other case treated elsewhere was operated for acute appendicitis; death occurred later.

The skin lesions were of exceedingly great interest. They appeared on approximately the ninth day of the disease in a considerable number of the cases and were observed in 42 out of the 52 patients. Their distribution in several instances involved the abdomen, chest, extremities and neck. While the rose spots were few in number in some of the minor cases, most of the severe ones had unusually numerous spots, many of them as large as a pea. The profusion and relatively huge size of the rose spots made a striking clinical picture. In a few cases successive crops were observed.

The spleen was palpable in 25, or approximately half of the cases, during the second week of the disease. The enlargement was moderate in most of the cases, and the spleen was most frequently palpable just below the costal margin.

The examination of the blood was interesting in that 10 out of 28 cases, during the first 8 to 10 days of the disease, showed a leucocyte count of 10,000 or above, reaching 14,000 in one case. In all of these, in which the count was later repeated, there was a reduction to below 10,000 cells. The finding of a slight leucocytosis is contrary to usual observations. Uhlenroth and Hubener⁴ state that there may be a leucopenia in paratyphoid fever. Tyron⁵, however, reports an epidemic of paratyphoid dysentery in which the white blood cells varied between 3,000 and 13,000 per cubic millimeter. The cases with complications, including local peritonitis, otitis media, and spondylitis, showed a leucocytosis, which aided in diagnosis. The urine in a majority of cases showed a trace of albumin and occasionally casts. No actual severe nephritis was seen. The diazo reaction was positive in only two out of 18 cases. The atropin test was tried in 5 cases. Following the use of

1/30 grain of atropin sulphate the effect upon the pulse rate was the same as in normal individuals.

The Widal reaction with bacillus typhosus (dilution 1-50) in 5 cases taken 3 to 5 days after the onset of the illness and 9 days after the presumptive date of infection was negative. In these same five cases the reaction was positive 4 days later. Cultures of bacillus paratyphosis B were used for agglutinative tests first after isolation of the organism from the discharges at the end of the second week of the disease. After that date agglutination occurred with bacillus paratyphosus B in 38 cases, in which higher titration was used, in dilutions of from 1 to 1,000 to 1 to 20,000. Agglutination of bacillus paratyphosus A did not occur in any case.*

A majority of cases, about 88 per cent, showed the presence of agglutinins for bacillus typhosus, some in dilutions as high as 1 to 1,000. This is in keeping with the common observation of the development by one member of the typhoid-paratyphoid group of agglutinins for other members.

Two of the cases with a negative Widal reaction followed by a positive had been vaccinated in 1918. Krumweide⁶ mentions that the application and interpretation of the results of the Widal reaction following vaccination become exceedingly difficult. Of 52 cases 20 had been vaccinated with typhoid-paratyphoid cultures in the usual manner, one in 1920, three in 1919, and the others in 1918. Three of the 20 cases had received only one of three injections. In the clinical course of the disease no marked variation was noted in the vaccinated group as compared with the unvaccinated. Bacillus paratyphosus B was isolated from the stools in 15 cases. Repeated examinations frequently gave negative results. Examination of stools during the first week give the greatest number of positive results according to many observers.

After the first few days the clinical picture of drowsiness and apathy formed a contrast with that of anxiety and restlessness found in acute respiratory infections. In most cases diarrhea abated as the disease progressed. The

fever commonly present arose rapidly, was of irregular intermittent type and often showed a daily variation of 2 to 3 degrees, sometimes associated with rigor and profuse sweating. Hyperpyrexia was not observed and in the most severe cases the temperature seldom went above 105°. The average duration of fever was 20 days. Defervescence usually occurred more rapidly than in typhoid fever. Mild and abortive types of the disease were observed of only a few days duration in which agglutinative tests aided in their diagnosis.

Complications were infrequent. However, one case during the second week of the disease developed intestinal hemorrhage which was persistent, did not yield to treatment including the transfusion of citrated blood and caused death. Autopsy revealed typical deep and coalescing ulcerations in the cecum and colon, fewer in the lower ileum, with changes in the mesenteric glands and spleen characteristic of typhoid fever. Extensive ulceration was present at the base of the appendix. In this connection it is interesting to note that in 16 fatal cases of paratyphoid fever Dawson and Whittington⁷ found at autopsy three cases with the appendix ulcerated and responsible for a peritonitis and conclude that the large intestine and appendix are more frequently involved than in typhoid. This is in keeping with the clinical observation of at least 4 cases in this series with evidence of appendicitis. Small amounts of blood were observed in stools in 3 or 4 cases. Otitis media prolonged the course in two cases and in one the development of a typhoid spondylitis was a cause of great distress to the patient. Altogether, complications were fewer and the course of the disease shorter than found in many epidemics of typhoid fever.

The early recognition of the disease, occurring in a city with a very low typhoid incidence, was difficult. At the first an enteritis from meat poisoning as occurs with absorption of toxins from the bacillus enteritidis and other organisms as mentioned by Krumweide⁸ was suggested, possibly of short duration. With, however, continued fever over some days and with quite marked prostration, typhoid fever was strongly suggested. In a few cases the

*The agglutinative tests and final bacteriology were done under the direction of Miss A. M. Wade of the laboratory of the State Board of Health.

signs suggested an acute respiratory infection. Wiltshire⁹ in a study of an epidemic of 98 cases in England caused by bacillus paratyphosus B, calls attention to the clinical resemblance to influenza and thinks that paratyphoid fever fills the gap in the clinical picture between typhoid fever and influenza. Blood cultures during the first eight days. In 5 cases were negative. Stool specimens were taken but reports were not available before the appearance of rose spots. Widal reactions which were absent in 5 cases during the first 8 days of the disease developed by the 10th day. Diagnosis was therefore not established until the appearance of the rose spots. The leucocyte count of 10,000 and above in several of the cases obviously gave no information of great differential value in diagnosis. The actual isolation of the bacillus paratyphosus B in the stools revealed the true character of the infection as one of paratyphoid fever. Bacillus paratyphosus B was found in 15 cases. One positive blood culture was obtained on about the seventh day of disease in a case that developed later in the epidemic. Clinically, the features were those of typhoid fever, especially during the first ten to twelve days. The shorter incubation period, the frequent abrupt onset, the shorter course of the disease, the fewer complications and the lower mortality rate coincide with the characteristics of paratyphoid fever.

Mode of Infection: It was promptly established by the Staff of the Division of Preventable Diseases of the State Board of Health in collaboration with Dr. John Sundwall, that the infected individuals, almost without exception, ate some of their meals at the Minnesota Union, that a majority had dinner there Sunday, March 13th, in several instances only at that time, and that milk was an article of diet commonly used. The milk used on this day was in bulk form. Of interest was the instance of a family of four in which following one Sunday dinner at the Minnesota Union the two children who had alone used bulk milk developed the disease while the parents were free from infection.

Investigation of all employees at the Minnesota Union revealed four carriers of bacillus paratyphosus B. Three were not ill. One had

slight symptoms but kept on duty. It is not known nor probable that these individuals were carriers previous to the epidemic. Of great interest was the discovery in one student, who later presented himself for inoculation, of a positive culture of bacilli paratyphosus B from the stool, with no history then or at any other time of illness. In other words, an individual himself immune was a carrier of possibly virulent paratyphoid bacilli. It seems probable that infection occurred through handling of bulk milk by a carrier. Krumwiede¹⁰ found 4 per cent of healthy carriers in a regiment of 786 soldiers infected with bacillus paratyphosus A.

CONCLUSIONS

1. In an epidemic of approximately 106 cases of paratyphoid fever among students, the clinical features were those of typhoid fever with variation in the occurrence of herpes about the lips in several cases, with unusually numerous and large rose spots, with comparatively sudden onset, with frequent profuse sweating, intermittent fever and often quite rapid lysis of fever. Complications were present in about 4 per cent of the cases and the mortality rate was about 2 per cent.

2. Infection probably occurred through the contamination of bulk milk by carriers.

3. Vaccination from 1 to 3 years previously did not confer immunity in the twenty individuals who had been previously inoculated with triple vaccine, or appreciably alter the course of the disease.

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DISCUSSION

DR. S. MARX WHITE, Minneapolis: This epi-

demic was of very great interest for a number of reasons. I had an opportunity to see a number of the cases in the Students' Health Service, and observed the students who were ill at the University Hospital. The mode of onset was of very great interest, possibly because of the character of the infection and because we had an opportunity to study a large number of cases and be impressed with the premonitory symptoms. The symptoms of the paratyphoid fever came on about the tenth day with the appearance of rose spots. The intestinal symptoms were very interesting and like those I had an opportunity of observing in 1904 at the Farm School. An infection got into the water supply at that time and there were sometimes gall-bladder and gall-duct symptoms occurring which did not occur in this epidemic, but the intestinal symptoms were much the same. In that epidemic while 160 students were involved, only two developed typhoid fever. It seemed that there was some typhoid infection at that time but the number who succumbed to it was small. At this last epidemic it is probable that the infection was in the milk, and for that reason the very great number succumbed to the infection.

Concerning the clinical features, Dr. McKinlay brought out some points which I would like to emphasize. The occurrence of herpes is rare in typhoid, but does occur. In typhoid fever the individual who shows herpetic symptoms will usually be shown to have herpes frequently from colds, and sometimes without any other evidence of nose or throat infection. The skin lesions in these cases were particularly striking. They were not the rose spots we ordinarily see in typhoid, the small pale lesions. They were much larger, they were raised, and the distribution was particularly striking for they showed lesions over the extremities. That is not peculiar to paratyphoid for we sometimes see it in typhoid, but in this epidemic they would frequently be present over the arms and wrists, and sometimes over the backs of the hands, these large, raised roseolae.

I wish also to emphasize the importance of the early leukocytosis. It is not unusual in typhoid. I have myself seen it in typhoid; in one instance a leukocytosis of 23,000 was found which rapidly subsided and after that showed leukopenia.

In conclusion, I think this epidemic illustrates very well the results of modern epidemiological work. As I understand it, practically all the cases were primary infection and through the application of epidemiological principles the disease was limited to that group.

DR. J. A. MYERS, Minneapolis: In the beginning of this epidemic the patients were being sent into the hospital in good sized numbers and it occurred to me to be a good opportunity to determine the effect of an acute disease other than pneumonia on the lung capacity. Peabody and Wentworth (1917) suggested that the low lung capacity observed during pneumonia convalescence may be present after

any severe acute infection. It was interesting to find that only a small percentage of the paratyphoid cases had lung capacities reduced to below normal limits. All complications, such as pleurisy, cardiac lesions and pneumonia caused a marked reduction in the lung capacity. Therefore, this test was found valuable in the early detection of such complications.

DYSTOCIA DUE TO OVARIAN TUMORS*

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Minneapolis, Minn.

An ovarian tumor complicating pregnancy is not so rare as was formerly supposed, due, no doubt, to more careful ante-partum examination. That they actually prevent conception must be admitted because of the frequency of ovarian tumors in the non-pregnant and their relative infrequency in the pregnant. On the other hand, they also increase the possibility of abortion. Remy in a series of 321 cases and Jetter in a series of 215 cases found that abortion occurred in 17 per cent of their cases.

The frequency of the association of pregnancy and ovarian tumors varies considerably as shown by various statistics. In 17,832 births in the Berlin Frauenklinik, an ovarian tumor was found only five times. This percentage is, no doubt, low as Shauta reports 12 pregnancies in a series of 1132 ovarian tumors. Wiener 11 pregnancies in 240 ovarian tumors while Norris states that ovarian tumors occur once in every 3000 pregnancies.

Much has been written upon the occurrence and management of ovarian tumors in pregnancy, labor and the puerperium. In this paper, I wish merely to consider their occurrence and management in labor and report a rather unusual case.

If the tumor is small and high up in the pelvis or abdomen, it may cause no trouble, but if it be low down, large and incarcerated in the pelvis or intraligamentous, it becomes a serious complication. Torsion of the pedicle of an ovarian tumor with its resulting necrosis and gangrene occurs two to three times more frequently in the pregnant than in the non-pregnant state. Its frequency in labor is

*Presented before the Clinical Club of Minneapolis, May 20, 1921 and the Fairview Hospital Staff, June 24, 1921.

given by various authorities at from 15 to 34 per cent. It is seen more often in the solid type of ovarian tumors such as dermoids and fibroids. Rupture of an ovarian tumor occurs in 13 to 25 per cent of the cases and is usually found in the large cystic type especially when under pressure as is seen during natural labor or operative delivery. The contents may be discharged into the abdominal cavity causing no untoward symptoms or resulting in severe shock, pain and vomiting, even peritonitis and death. If the circulation of the tumor is interfered with from pressure or torsion, sup-puration may take place followed by rupture with chills, fever, peritonitis and death. In some cases of the cystic type, a hemorrhage may take place into the cyst resulting in its rapid enlargement with symptoms of internal hemorrhage. If this hemorrhage has existed for some time and the contents have become thick, tarry and sticky, they are readily infected by lying against infected tissue such as the rectum and may also suppurate and rupture, resulting in peritonitis and death. Some of the larger more solid types of ovarian tumors not properly managed during labor may result in rupture of the uterus or, if low in the pelvis, may be forced ahead of the child and rupture into the vagina or rectum and thus out of the body; spontaneous ovariectomy.

The diagnosis of an ovarian tumor during labor is frequently difficult. If it is out of the pelvis it may be hidden from examination, lying entirely under the spleen or liver. The lumbar regions should always be carefully palpated as it can very often be located here. It must not be confused with a hydronephrosis. If free in the abdominal cavity it can be palpated as a spherical mass and must be differentiated from a uterine fibroid, double horned uterus or a twin. If it is low down and incarcerated in the pelvis, its nature can usually be determined by a rectal examination when it must not be mistaken for a hematoma or a prolapsed kidney. During a pain it may become so tense as to be mistaken for a fibroid. It is very important that it be differentiated from a fibroid because fibroids usually cause much less trouble during labor and recede after delivery. This frequently cannot be done before operation. In cases of doubt, the examina-

tion should be made with the patient under anesthesia. In this connection, it may be well to remember that an ovarian cyst may simulate a pregnancy as in the case cited by Cragin of a girl with amenorrhea, enlarged abdomen, fluid in the breasts and darkened areolae which was diagnosed by examination under ether anesthesia and verified at operation. On the other hand pregnancy may be overlooked in the presence of a tumor when the abdomen is opened. The uterus has been opened by mistake or accidentally and when this happens, it should be emptied and the wound closed as in Caesarian section.

The prognosis does not depend so much on the size of the ovarian tumor as it does upon its location, its nature, the promptness with which it is recognized, and the skill of the one in charge. The mortality from this complication has decreased markedly as is seen when some of the earlier statistics are compared with the more recent reports. This is due to earlier diagnosis and more skillful management, resorting more frequently to laparotomy rather than vaginal puncture or incision and the expectant form of treatment formerly practiced. McKerron's statistics show a maternal mortality of 30.5 per cent and a fetal mortality over 50 per cent. In Heiberg's series of 271 cases with delivery by forceps without puncture of the cyst, the maternal death rate was 50 per cent; with puncture, almost as great; and after version without puncture more than 50 per cent. Patton, in 1906, in a series of 95 cases treated expectantly the maternal mortality was 26.3 per cent; in 31 cases treated by tapping, the mortality was 38.7 per cent; in 184 cases treated by ovariectomy the mortality was 4.3 per cent. In more recent statistics as those of Herbert Spencer, we find no maternal mortality and a fetal mortality of 32 to 33 per cent depending on the method of treatment.

TREATMENT

When the patient is seen in labor with an ovarian tumor which apparently is not obstructing labor, it may be well to leave it alone although the second stage of labor may be hastened using mechanical dilation, Vorhies bags, hysterotomy or forceps. Version should never be done. If the cervix is closed and

very firm, vaginal caesarian section may be indicated. Spencer recommends ovariectomy at the end of the first stage followed by forceps delivery by the assistant. After delivery, if ovariectomy has not already been done, it should be done in 24 to 48 hours to prevent any infection which may follow injury to the tumor. To do a laparotomy and remove the tumor mass closing the abdomen to allow labor to progress naturally is not the best procedure because of undue strain on the recent scar. There are cases on record, however, that have been managed in this way with no bad results.

On the other hand when we find the tumor is actually obstructing labor, we have a much more serious condition. If the patient is seen early in labor, attempts should be made to push the obstructing mass up out of the pelvis. This can best be accomplished during deep anesthesia with the patient in the Trendelenburg, exaggerated Sims, or knee-chest position. This, however, is a very dangerous procedure and so has been abandoned by many obstetricians. Great care must be used because of danger of injury to or rupture of the tumor. It can also be tried in cases seen late in labor when still more care must be exercised in the attempt. If the labor is dry, the lower uterine segment is very thin. It should never be attempted in dermoids, or infected or adherent tumors. If the tumor can be replaced, the patient can be allowed to continue in labor and be delivered naturally or if there is a complete dilatation of the cervix, forceps may be applied. It is also well to remember that the tumor may again fall into the pelvis and interfere with the delivery of the placenta. After delivery, the tumor should be removed as early as possible by laparotomy.

If the tumor is adherent or incarcerated in the pelvis, laparotomy should always be done. The best procedure and the one advocated by most obstetricians is to do Caesarian section followed by ovariectomy. This is certainly the course to pursue if the cervix is not dilated. Some authorities recommend waiting for complete dilatation of the cervix, but this is not without some danger. If the cervix is completely dilated and laparotomy is done, attempt should be made to raise the tumor from the pelvis by pushing the uterus aside. If this is

successful the child can be delivered by forceps by an assistant through the natural passages and finally ovariectomy be performed. If the tumor mass cannot be raised out of the pelvis or is infected, Caesarian section should be done and the mass removed afterward. If both ovaries are involved and it is impossible to save ovarian tissue, a Porro operation had better be performed. Also, in the presence of infection, a supravaginal hysterectomy should be done at the same time draining the pelvis or attaching the stump extraperitoneally as recommended by Norris. The abdomen is, perhaps, best opened through a median incision. In removing the mass great care should be used in tying the ovarian vessels. Silk ligatures seem to be the best as there is less danger of their slipping or being absorbed too early. If the head of the child becomes firmly wedged between the tumor and the side of the pelvis, craniotomy is the best procedure.

Vaginal section may be done in some selected cases where the tumor is small and free. It is more difficult to palpate the other ovary by this route and in operating, the pedicle may slip away before tying. It is rarely done, being supplanted by the abdominal route.

Some good results have been reported by puncturing the cystic mass through the vagina or incising the tumor and packing till the child is delivered when the tumor is removed in 24 hours. There is danger of injury to large blood vessels and the uterus as well as infection and adhesions. The relief at best is only temporary. This is rarely done at the present time and its only indication seems to be when the patient is at a distance from competent help and something must be done at once.

If the patient is allowed to continue in labor and the obstruction not recognized, we may have the tumor forced ahead of the child, finally rupturing either into the rectum as happened in my case or through the vagina. If the birth of the child does not follow the rupture of the tumor into the vagina, the tumor should be removed and the child delivered by forceps. On the other hand, if the rupture has taken place into the rectum, there is less danger of infection if the child is delivered by forceps and the tumor dealt with afterwards,

even though the forceps delivery may add to the trauma of the maternal tissues.

I wish to report a case which can under my observation at the Minneapolis General Hospital. I have not been able to find in the literature at my disposal a similar case reported.

Mrs. E. O. Swedish woman, aged 37, married, white. Family history—negative.

Personal history—Married four years, one child 2½ year ago—Instrumental delivery—child died on the third day. Mother was in the hospital two weeks because “she couldn’t walk and felt a bearing down pain all the time.” She doesn’t believe she had any fever and at the end of a month felt perfectly well. Has had no miscarriages.

Menstrual history—Menses have always been irregular coming on as often as every two weeks until the birth of her child, since which time they have been more normal. Menstruation started at 13 years, has been irregular, painful, as often as two times a month, lasting four or five days, considerable in amount and containing small clots.

Past history—She has never been sick aside from slight sore throats. She menstruated last time on May 27, 1916. She had some slight nausea and vomiting during the early months of pregnancy, otherwise felt perfectly well. She doesn’t remember when she felt life for the first time. Bowels, bladder and breasts gave her no trouble. She had a slight headache before her entrance. The Dispensary records show she made a visit there on Feb. 7, 1917, at which time, nothing abnormal was noted.

History of Present Illness—She was taken sick on Feb. 21, 1917 at 8 A. M., while in bed when she noticed water coming away from her. On arising, she felt pains come on at once which gradually increased and she came to the hospital, entering at 10:15 A. M. on Feb. 21, 1917. Labor progressed normally, the pains gradually increasing in frequency and severity. I did not see the patient until 4:30 P. M. when called by the interne. Examination of the patient was negative except for the pregnancy and labor. The blood pressure and urine examination was normal. The pelvic measurements were 25-27-31-19. Abdominal palpation showed a fetus LOA position with the fetal heart 140, of good quality, heard to the left and below the navel. Pains were strong and regular coming every 3 minutes. The interne informed me he made a rectal examination but could not feel the head, thinking it was either a breech or edematous cervix. Abdominal examination showed the buttocks in the epigastrium with the back to the left and front and the head toward the pelvis floating high and not at all engaged. During the pains, the vulva showed slight gaping as did the anus. After surgical preparation, a vaginal examination was made, the head was found very high with the cervix low, the posterior lip lying on the posterior vaginal wall. During the pain, a firm mass seemed to press up

from the rectal side which caught the finger in the vagina rather firmly. At the same time, I noticed the anus gap and a dark bluish mass presenting at the anal opening. Rectal examination was then made and a softened elastic mass could be felt, which could be pushed back into the rectum for some distance but not enough to get a feel of the head. This mass again came down with the next pain and looked very much like a hematoma. It was then discovered that the rectal mucous membrane was torn for some distance and we were dealing with a neoplasm, probably ovarian. After some thought, with the patient in very active labor and the damage already done, the child was delivered by forceps at 5:37 P. M. with only a slight mucous tear. The recto-vaginal septum was very thin and only consisted of the vaginal mucous membrane. The placenta was delivered in 15 minutes with the aid of Crede. Close examination was now made of the rectum showing the tear about six inches long on the anterior rectal wall leaving only vaginal mucous membrane to separate the rectum and the vagina. The bluish tumor mass could be seen retracting upward and situated outside of the rectum in the space between the rectum and the vagina. The vaginal mucous membrane was slit upward giving more room to deal with the tumor. The cystic tumor mass was pulled down and its pedicle ligated carefully and the cyst removed. The pedicle was allowed to retract after irrigating the cavity with a weak solution of lysol. The peritoneal opening was closed by a high purse-string suture. The rectal mucous membrane was next closed and the perineal body built up, finally approximating the vaginal mucous membrane, reinforcing the chronic cat gut stitches with four silk worm gut stitches and placing a cigarette drain deep to the peritoneal opening through the perineum. The patient was given strychnine and ergot by hypo. Her condition was good on leaving the table.

Examination of the tumor shows a bluish soft elastic multilocular mass about the size of two fists. It consisted of numerous cysts varying in size, some filled with a clear straw colored fluid, others with a semi-gelatinous material.

Microscopic examinations showed a multilocular cystadenoma of the ovary.

Subsequent history: The patient had to be catheterized for one day following the delivery. She had involuntary bowel movement following castor oil on the third and fourth day, after which she was able to control them. The drainage was removed on the third day. She developed some burning urination on the tenth day which cleared up in two days. On the eleventh day the stitches were removed and the patient also developed some soreness of the right nipple. This was followed next day by tenderness of the breast but no fever and practically cleared up on the sixteenth day. On the eighteenth day she was taken with chills and fever with headache and a sore throat. The temperature was 100.6 and

pulse 98. The throat was painted with silver nitrate after taking a culture and a gargle was given. The culture was negative and the throat gradually improved. On the twenty-fourth day the throat seemed to get worse as did the right breast which seemed painful and tender, temperature rising to 104 and pulse 120. The throat gradually became worse, markedly swollen and a peritonsillar abscess was found which was opened on the twenty-ninth day with the escape of a large amount of pus. The breast was treated with binders and an ice cap but in spite of this it gradually grew worse so it was opened on the forty-first day after delivery with escape of a large amount of pus, a culture of which proved to be a pure staphylococcus. The temperature and pulse both dropped after opening the breast and lancing the peritonsillar abscess. The rest of the convalescence was normal. There was primary union of the perineal tear and the patient was able to control the bowels after the fourth day. The patient was discharged on the sixty-eighth day after delivery. The baby showed no ill effects from the mother's stormy convalescence.

The patient was again seen one month after leaving the hospital and examination at that time showed her in excellent health. She said she could not feel better. Examination of the perineum showed it very well healed and competent. She had no trouble at all with the bowels.

In conclusion, I would say

1. Diagnosis of the presence, nature and location of an ovarian tumor during labor is of the utmost importance.

2. The treatment of this complication should be dealt with more from an obstetrical standpoint rather than a surgical one.

3. If the tumor does not obstruct the passage of the child, labor may be allowed to terminate normally but the tumor should be removed as soon after delivery as possible.

4. If the tumor obstructs the birth of the

child, careful attempts should be made to reposition the tumor and allow the labor to terminate normally.

5. If reposition is impossible, laparotomy should be done.

6. When laparotomy is done, attempts should be made to bring the tumor out of the pelvis. If this is possible it can be removed and the child delivered through the natural passages. If not, Caesarian section shall always be done followed by ovariectomy. In the presence of infection, hysterectomy had better be done.

7. Vaginal puncture and vaginal incision of the tumor should be done only when skilled help is not obtainable and the obstruction must be relieved. When done it should be followed by laparotomy as soon as possible.

8. Vaginal celiotomy for removal of a tumor frequently entails many difficulties and may better be replaced by the abdominal route. It should only be done when the tumor has a long pedicle, is small and not adherent.

9. Vaginal Caesarian section should be restricted to cases in which the cervix is firm and undilatable and the tumor free in the abdomen.

10. Forceful delivery by forceps or version in the presence of an obstructing tumor should rarely if ever be done.

11. An impacted head complicated by an ovarian tumor should be dealt with by craniotomy.

I wish finally to express my thanks to Dr. F. L. Adair, on whose service the patient was admitted, for his kind permission to report this case.

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EDITORIAL

PRESIDENTIAL SELECTION

For many years there has obtained in the Minnesota State Medical Association, so far at least as we are able to ascertain, an unwritten law which provides that the Presidency of the Association shall be had one year by a resident of Minneapolis, the next year by a resident of St. Paul, and the third year by a resident of the state at large. Why this particular and peculiar method of rotation was established, or why it should continue, or whence it originated, we have not been able to determine, and we have been more or less familiar with the proceedings of the Society for the last twenty-five or thirty years.

We are of the opinion that the rule should be abrogated for the reason that it is neither just nor equitable. It may be possible that during the earlier years of its existence the Society found it difficult to select men of large attainments outside the cities; but most assuredly such is not now the case, for in almost every city of any size there are men whose qualifications are quite equal to any of those resident in the two larger cities.

It will be found on looking over the scientific programs of the meetings for several years

past that most of the papers contributed come from men in the cities, but it will also be noted by those who have attended the scientific sessions or have read the published articles that papers contributed by the so-called "country members" have as much merit and contain as much valuable material as do those of their brethren in the larger centers of population.

We believe that a large proportion of our country members have a well defined idea that the Association is run primarily for and by the profession of the Twin Cities, and this assertion is made only after a careful consideration of replies to questions directed to them on this particular point.

We are of the opinion that the time has now come when we should depart from this time honored and, we might also say, obsolete custom, and elect our presiding officer from the state at large, not giving any consideration whatsoever to any particular city or location.

J. T. CHRISTISON,

For the Editing and Publishing Committee.

MINNESOTA AND THE REFERENDUM ON ALCOHOL

The results of this appeal to the profession in Minnesota were published in the Journal of the A. M. A., the issue of Jan. 14, 1922. It is notable that many of the leading newspapers of the State immediately came forth with news and editorial notice.

The present method of suggesting ultimate prohibition has not put the medical profession in an enviable light; it is doubtful whether the excellently intentioned plan of the A. M. A. is going to improve our position.

We know among ourselves that taking a vote on any mooted scientific point would be a shamelessly unscientific method of deciphering the truth. No matter how the doctors may vote on this question of whisky as a medicine, most critics will wish to know how we stood on the question of whisky as a beverage. It is notorious that doctors commonly urge their patients to strenuously avoid food that is distasteful or has proven disastrous to themselves—this often quite independent of the caloric possibilities of the food interdicted.

Then, doctors have never been noted for a

proclivity to unanimity. Witness the jumble we get into when we get into court, testifying as so called "experts," with skilled attorneys to bring out and direct our testimony. The referendum, of course, seeks to get the medical judgment purely on the question of the need of alcohol as a drug. It is beside the point to remind us that it is not our business to make comment on the principles of prohibition or the degree of its success. This must be apparent, because up to date the recognized medical profession is the only agency through which alcohol in beverage form, for sick or well, can **legitimately** be secured. The best of our profession sorely resents this state of affairs, because anyone can see how directly this unites up the unprincipled among us with the agencies in the field seeking to supply those suffering souls, who see in every shift of the wind a possible attack of "flu," or in every rustle of the grass a rattlesnake ready to strike.

In this inquiry only twelve Duluth physicians admitted having federal permits to prescribe liquor. Beer and wine, in neither city nor rural practice in Minnesota appear to have many strong adherents. This is what might be expected in a state of, "such magnificent distances," where bulk counts, and where the profession has not been given over much to the reading of foreign medical literature.

As far as whisky is concerned, it is to be noted that conservative St. Paul voted forty-two in favor of whiskey and forty-one against it. This is supposedly from the medicinal point of view, but those who know best the medical history of our State see in these comparative figures nothing unusual.

Minnesota as a whole voted definitely against alcohol as a necessary stimulant. Nevertheless, many conscientious physicians feel that it has a place. The science of Physic is not so impoverished but that we might well dispense with a good many fairly useful medicines. This has been repeatedly done; for what we cannot accomplish in one manner we can usually devise other agencies. Many drugs with far less obnoxious secondary effects than alcohol have been thrown in the discard, and we are professionally none the losers thereby, but mankind is not interested in our pharmacological

dissertations on alcohol as a medicine, but is amazingly wedded to the cup that inebriates, even though it cheers.

All through the letters that have come to the A. M. A. pertaining to this situation is the urgent suggestion that the Government should itself dispense such liquor for which there appears to be an actual need. If this were done it would remove much of the opprobrium that naturally now falls on our profession. We are being made the butt of endless jokes in vaudeville and out by our prescription writing brethren. If whisky is any good at all it ought to be at least pure. Those who learned well how to make it, and preferred to age it an indefinite number of years, evidently did so not for pastime but for good and sufficient reasons. Those who drank properly made whisky which had been given a chance to age and lose some of its toxicity, were able to work the next day. Most of the old school, genteel drinkers, have accepted prohibition; the younger aspirants for fame seem willing to drink anything in a bottle. The Government could at least issue pure alcohol or whiskey.

A new generation that had not been fed up on the idea of alcohol and its beverage variations may some time control public opinion. In that time the medical uses of alcohol will present no greater difficulties than those of digitalis or caffeine, and incidentally, let it be noted that there is no limitation now imposed on the number of prescriptions any doctor may write for these recognizedly useful drugs.

E. L. T.

INFLUENZA IN 1922

The prevalence of influenza reported from various eastern points during the past month is most alarming. We are accustomed to expect more or less of a grippal seizure during the early months of each year, but reports go to show that this year the number of cases constitute a very decided and severe epidemic.

Various localities in England have been visited by epidemics of influenza since last November, which have lasted some six to seven weeks. London was hard hit in mid-December, and in early February there was no indication of a decline in the number of deaths reported.

It is noticeable that infancy and old age are most heavily attacked, in marked contrast to the epidemic of 1918, when youth bore the brunt of the attack. It is reported that the complication of pneumonia is not so serious during the present epidemic, and it would be interesting to know what the cause of the present high mortality is.

Eastern points in the United States have been severely attacked by the return or re-emergence of the influenza epidemic. We are informed that the high mortality at present in New York is due to pneumonia, not however, a complication of influenza. The influenza itself is reported as not being so severe nor so prone to the complication of pneumonia as in the epidemic of three years ago.

It is fair to suppose that the present epidemic will reach Minnesota, sooner or later, and it behooves the profession to be as prepared as possible for this pest for which in honesty we must admit we have no specific remedy, and, in fact, the cause of which we do not know. In spite of the extensive study of the epidemic of 1915 (or shall we say 1918-1922) the bacteriology of the disease is obscure. We are justified, however, in advocating prophylactic inoculations of the mixed vaccine (so-called influenza vaccine) in the hope of lessening the likelihood of complications, notably pneumonia. The importance of the use of fresh vaccine cannot be overemphasized. Quarantine, though inefficient, should be carried out. The strange tendency of epidemics to recur periodically (some have noted a periodicity of thirty-three weeks in influenza) has not been explained by the epidemiologists. It would seem that a certain active immunity in influenza does take place, a fact emphasized by the report that the age incidence in the present epidemic is decidedly different from that of the epidemic in 1918.

OBITUARY

Alfred J. Murdock, M. D., 3161 Columbus Ave., Minneapolis; born 1847, graduated from Columbia University in 1869; died January 4, 1922.

Christian Johnson, M. D., Everett, Washington. Practicing physician in Minnesota for thirty-six years, formerly residing at Willmar. Born July 17, 1853; graduated from the Washington University Medical School in Baltimore in 1875. Died January 3, 1922.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

AMERICAN CONGRESS OF INTERNAL MEDICINE
Rochester and Minneapolis, April 3 to 8, 1922.

The annual meeting of the American Congress of Internal Medicine, which is the medical organization corresponding to the American College of Surgeons, will convene the first three days beginning April 3rd in Rochester, and the last two days, Friday and Saturday, in Minneapolis. Many distinguished visitors from all over the United States are expected to attend this meeting, and on Friday it is scheduled a convocation to which all guests will be welcome.

MINNEAPOLIS CLINIC WEEK

April 10 to 13, inclusive

The Hennepin County Medical Society will hold its fifth annual Clinic Week this year April 10 to 13, inclusive. This immediately follows the meeting of the American Congress of Internal Medicine, the last two days of which will be held in Minneapolis, on Friday and Saturday. This will enable visitors to include both of these important meetings in the same visit to Minneapolis. The headquarters of Clinic Week will be at the Hotel Radisson, and a number of distinguished members of the profession have been invited to address the meetings. The program will appear later.

The third regular meeting of the Minnesota Branch of the Society for Experimental Biology and Medicine was held at the University of Minnesota on Wednesday evening, February 8, 1922. The scientific session was preceded by the usual dinner in Room 208, Men's Union at 6:30 p. m. The scientific session was held in Room 129, Millard Hall, at 8:00 p. m.

The following papers were read:

1. R. A. Gortener and W. F. Hoffman (by invitation), "Evidences of a Gel Structure in Gelatin Gels."
2. F. H. Scott and C. C. Gault (by invitation), "The Regulation of Respiration."
3. A. T. Henrici and G. S. Reynolds (by invita-

tion), "Potassium Iodide Does not Inhibit Experimental Actinomycosis."

4. Leonard Larson (by invitation), and W. P. Larson, "Factors Which Control the Fat Content of Bacteria."

PRELIMINARY PROGRAM PUBLIC HEALTH INSTITUTE, UNIVERSITY OF MINNESOTA, MINNEAPOLIS, MINN., MARCH

20 to 25, 1922

Offered by Medical School, University of Minnesota, State Board of Health and United States Public Health Service.

Lectures—Clinics—Demonstrations—Conferences.

COURSE I.

"VENEREAL DISEASES," Dr. H. G. Irvine, director, Division of Venereal Diseases, Minnesota State Board of Health. For physicians, health officers and others engaged in treatment or control of venereal diseases.

SYPHILIS. Six lectures with day and evening clinics.

1. Early Syphilis, Symptoms and Diagnosis,
2. Visceral Syphilis, Symptoms and Diagnosis,
3. Neural Syphilis, Symptoms and Diagnosis,
4. Congenital Syphilis, Symptoms and Diagnosis,
5. Interpretation of Blood and Spinal Fluid Tests,
6. Treatment of Syphilis.

GONORRHOEA. Four lectures with day and evening clinics.

1. Acute Gonorrhoea in the Male, Symptoms and Diagnosis Treatment,
2. Chronic Gonorrhoea in the Male, Symptoms, Diagnosis, Treatment,
3. Acute Gonorrhoea in the Female, Symptoms, Diagnosis, Treatment,
4. Chronic Gonorrhoea in the Female, Symptoms, Diagnosis, Treatment.

PUBLIC HEALTH EDUCATION AND VENEREAL DISEASE

CONTROL—EIGHT LECTURES

1. "The Principles of Public Health Education," by Dr. Fred R. Green, secretary, Council on Health and Public Instruction, A. M. A.

2. "The Legal Limitations, Powers, and Duties of Health Officers," Dr. Fred R. Green.

3. "Health Education in Sex Hygiene."

4. "The Delinquent Girl and Venereal Diseases," Miss Jessie Binford, Interdepartmental Social Hygiene Board.

5. "The Courts in Relation to Venereal Diseases and Delinquents."

6. "What Minnesota Has Done to Control Venereal Diseases," Dr. H. G. Irvine, director, Division of Venereal Diseases, Minnesota State Board of Health.

7. "Social Service in Relation to Venereal Diseases."

8. "Law Enforcement in Relation to Prostitution."

Note: Lectures 1 to 6 are common to both courses.

DR. FRED R. GREEN

A public lecture on the development of modern scientific medicine, illustrated with lantern slides and moving pictures, and entitled, "The Invisible World, a Health Travelogue."

Monday, March 20, 8 p. m., in East High School Auditorium.

COURSE II.

"MATERNAL AND INFANT HYGIENE," directed by Dr. E. P. Lyon, Dean Medical School, U. of M.

For physicians, health officers, public health nurses and others who now are or will be engaged in maternal and infant welfare work or its promotion. Eighteen lectures.

1. "What Has Been Done for Maternal and Infant Welfare in Minnesota," Dr. Wm. F. Wild, executive secretary, Minnesota Public Health Association.

2. "History of Maternal and Child Welfare Work," Dr. Fred W. Schultz, Minneapolis.

3. "Principles of Maternal Welfare," Dr. Fred L. Adair, associate professor of Obstetrics and Gynecology, University of Minnesota.

4. "Common Disturbances of New-Born Infants," Dr. F. C. Rodda, associate professor of Pediatrics, University of Minnesota.

5. "The Rural Clinic Program," Dr. N. O. Pearce, associate professor of Pediatrics, University of Minnesota.

6. "The Principles of Child Hygiene," Dr. Walter R. Ramsey, associate professor of Pediatrics, University of Minnesota.

7. "The University Courses in Public Health Nursing," Miss Florence Jones, director Public Health Nursing, University of Minnesota.

8. "How to Raise a Community Fund," Mr. Otto Davis, executive secretary, Minneapolis Council of Social Agencies.

9. "Part of the A. R. C. Nurse and Chapter in the Infant Welfare Program," Miss I. C. Johansen, Field Supervisor, A. R. C.

10. "Results of Proper Maternal Care," Dr. Fred L. Adair, associate professor of Obstetrics and Gynecology.

11. "The Artificial Feeding of Babies," Dr. E. J. Huenekens, assistant professor of Pediatrics.

12. "The Organization and Administration of Infant Welfare Work," Miss Natalie Rudd, executive secretary, Infant Welfare Society of Minneapolis.

13. "Common Errors in the Care of Young Infants," Dr. Walter R. Ramsey, associate professor of Pediatrics, University of Minnesota.

14. "Woman's Responsibility in Putting the Shepard-Towner Law Into Effect," Miss Marguerite M. Wells, president Minnesota League of Women Voters.

15. "Pre-Natal Field Work and Nursing Pro

cedures," Miss Helen C. Peck, supervisor Pre-Natal Field Work, Minneapolis Infant Welfare Society.

16. "Welfare of Children During Pre-School Age," Dr. E. J. Huenekens, assistant professor of Pediatrics.

17. "Practical Application of the Principles of Infant Welfare Work," Miss Natalie Rudd, executive secretary, Minneapolis Infant Welfare Society.

18. "The State Program for Maternal and Infant Hygiene," Dr. A. J. Chesley, executive officer Minnesota State Board of Health.

19. "Nursing Technic and Standards of the Visiting Nurse," Miss Alma Haupt, assistant superintendent of the Minneapolis Visiting Nurses Association.

20. "The Social Agencies of Minnesota in Relation to Infant Welfare Work," Mrs. Mildred Mudgett, supervisor of Field Work, Sociology Department of University of Minnesota.

Venereal Disease Clinics are exclusive for physicians and others actually engaged in the treatment of venereal diseases.

Infant and Pre-Natal Clinics will be given at-

ST. PAUL

Wilder Charities, 20 persons, Monday, Wednesday and Friday afternoons.

MINNEAPOLIS

Margaret Barry House, 4 persons, Monday and Friday afternoons.

Southtown Clinic, 4 persons, Monday and Friday afternoons.

Unity House, 4 persons, Tuesday and Friday forenoons.

Wells Memorial House, 4 persons, Tuesday and Friday afternoons.

Northeast Neighborhood House, 4 persons, Tuesday, Wednesday and Friday afternoons.

Pillsbury House, 20 persons, Wednesday afternoon.

Talmud Torah, 4 persons, Thursday afternoon.

Monday, Wednesday and Friday afternoons, those who are not attending clinics will be assigned to Group Conferences, Demonstrations, Visits to Hospitals, Milk Stations or Nutritional Clinics, so everyone will have opportunity to study every phase of practical work.

On Friday evening at 8 o'clock, the Parents' and Teachers' Association of St. Paul, presents a health program in the St. Paul Auditorium, to which all are invited.

Anyone who desires to attend the Institute should send notice at once stating the course in which he wishes to register.

Adjustment of program in case one desires to combine parts of the two courses, must be made in advance.

Registration begins promptly 8:30, Monday, March 20th.

Assignment to classes and clinics, etc., must be made at that time.

Attendance at Institute is absolutely free.

Please notify Dr. A. J. Chesley, director of the Institute, care of State Board of Health, State Capitol St. Paul, about attendance and courses.

The Park Region Medical Society held its annual meeting at Fergus Falls in January, at which the following officers were elected: President, Dr. A. C. Baker; Vice President, Dr. John Hoffman; Secretary-Treasurer, Dr. Theo. S. Paulson.

The Winona County Medical Society at its recent annual meeting elected the following officers for the ensuing year: President, Dr. Hans Lichenstein; Vice President, Dr. W. V. Lindsay; Secretary, Dr. C. P. Robbins; Treasurer, Dr. Irwin Steiner.

THE ST. LOUIS MEETING OF THE AMERICAN MEDICAL ASSOCIATION

May 22-26, 1922

The May meeting of the American Medical Association at St. Louis promises well toward being the largest in attendance of any of the Association's sessions. Since the publication of the hotels in the Journal of the Association in December, inquiries and reservations are being made daily. The hotels and the Convention Bureau are aiding the Committee in a most satisfactory and helpful way to see the Fellows are comfortably housed and accommodated. The A. M. A. meetings tax all cities entertaining them to the limit of hotel capacity. Whenever possible a good Fellow should double up so that no one is left without a comfortable lodging.

Reservations should be made by communicating direct with the hotels. If satisfactory arrangements cannot be made in this way, write to Doctor Louis H. Behrens, Chairman Committee on Hotels, 3525 Pine Street, St. Louis Mo.

A. M. A. MEETING St. Louis, May 22-26, 1922

The Western Passenger Association has authorized a special rate on the certificate plan of a fare and a half for round-trip for all points to St. Louis and return at the time of the annual meeting of the A. M. A. Minnesota physicians may purchase tickets at the same rate via Chicago, allowing a stop-over of ten days in Chicago. The Chicago and Eastern Illinois calls attention to their service trains leaving Chicago at 10 A. M., 9:15 and 11:30 P. M., arriving respectively in St. Louis at 5:50 P. M., 7:05 and 7:30 A. M.

ST. LOUIS' LEADING HOTELS (ALL EUROPEAN PLAN), THEIR LOCATION AND RATES

Hotel, with Number of Rooms	Street Address	Without Bath		With Bath	
		Single	Double	Single	Double
American, 275..... <i>Diseases of Children</i>	7th and Market Sts.....	.....	.....	\$2.50-3.00	\$4.00-6.00
American Annex, 225..... <i>Pathology and Physiology</i>	6th and Market Sts.....	.....	.....	2.00-3.00	3.00-6.00
<i>Pharmacology and Therapeutics</i>					
Beers, 114.....	Grand and Olive Sts.....	\$1.50	\$2.50	2.00-2.50	3.00-3.50
Brevort, 50.....	4th and Pine Sts.....	.....	.....	2.00	3.00
Cabanne, 43.....	5545 Cabanne St.....	.....	.....	12.00-37.50*	
Claridge, 350..... <i>Obstetrics, Gynecology and</i>	18th and Locust Sts.....	.....	.....	2.50-4.00	4.00-10.00
<i>Abdominal Surgery</i>					
Hamilton, 160.....	Hamilton and Maple Sts....	.....	.....	2.00-2.50	3.50-4.00
Jefferson, 400..... <i>Surgery, General and Abdominal</i>	12th and Locusts Sts.....	2.50-3.00	4.00	3.00-8.00	6.00-10.00
<i>Orthopedic Surgery</i>					
Laclede Hotel, 265.....	6th and Chestnut Sts.....	1.50-2.00	2.50-3.00	2.50-3.00	3.50-4.00
Majestic, 200..... <i>Dermatology and Syphilology</i>	11th and Pine Sts.....	.....	.....	2.50-3.00	3.50-4.00
<i>Nervous and Mental Diseases</i>					
Marion Roe, 200.....	Broadway and Pine Sts....	.....	.....	1.50-2.00	3.00-4.00
Marquette, 400..... <i>Laryngology, Otology and</i>	18th and Washington Sts....	2.00-2.50	3.00-3.50	3.00-3.50	4.00-6.00
<i>Rhinology</i>					
Maryland, 240..... <i>Gastro-Enterology and Proctology</i>	9th and Pine Sts.....	2.00	3.00	2.00-3.50	3.00-5.00
<i>Urology</i>					
Planters, 400..... <i>Ophthalmology</i>	4th and Pine Sts.....	2.00-2.50	3.00-3.50	2.50-5.00	4.00-8.00
Plaza, 200.....	3300 Olive St.....	.....	.....	2.00-2.50	3.50-5.00
Roselle, 100.....	4137 Lindell Blvd.....	.....	.....	1.50-2.50	2.50-3.50
St. Francis, 120.....	6th and Chestnut Sts.....	1.50-2.00	2.50-3.00	3.00-4.00	4.00-5.00
Statler, 650..... <i>Practice of Medicine</i>	9th and Washington Sts....	.....	.....	3.00-7.00	5.50-9.50
Stratford, 100.....	8th and Pine Sts.....	1.50-2.00	3.00	2.50	3.50
Terminal, 100.....	Union Station.....	1.50	2.50	3.00-3.50	5.00
Warwick, 200..... <i>Stomatology</i>	15th and Locust Sts.....	.....	.....	2.00-4.00	4.00-6.00
<i>Preventive Medicine and Public Health</i>					
Westgate, 125.....	Kingshighway and Delmar Sts	2.00	2.50	3.00	3.50

*Weekly rates only.

The regular monthly meeting of the Hennepin County Medical Society was held in the library, Donaldson Bldg., Monday, Feb. 6, 1922, at 7:45 P. M.

PROGRAM

Monday Evening, Feb. 6th, 1922

1. "Lymanhurst," F. E. Harrington, M.D., LL.D., Commissioner of Public Health and Director of Hygiene.

2. "Cardiac Signs in Early Pulmonary Tuberculosis in Children," Thomas Ziskins, M.D., Consulting Cardiologist, Lymanhurst School for Tuberculous Children.

3. "Morphological Studies on the Blood of Tuberculous Children," Hal Downey, Ph.D., and A. R. Ringoen, Ph.D., Consulting Hematologists, Lymanhurst School for Tuberculous Children.

4. "Gastro-Intestinal Findings in a Group of Tuberculous Children," C. B. Wright, M. D., Consulting Gastro-enterologist, Lymanhurst School for Tuberculous Children.

5. "On the value of Vital Capacity of the Lungs of

Children as an Aid in the Diagnosis of Pulmonary Tuberculosis," C. A. Stewart, M.D., Consulting Pediatricist, Lymanhurst School for Tuberculous Children.

6. "A Preliminary Report of the X-ray Findings in a Group of Tuberculous Children," R. G. Allison, M.D., and R. E. Morse, M.D., Consulting Roentgenologists, Lymanhurst School for Tuberculous Children.

7. "A Comparison of the Height-Weight Indices of Suspected Tuberculous and Normal School Children," R. E. Scammon, Ph. D., Consulting Anatomist, Lymanhurst School for Tuberculous Children.

8. "A Study of the Clinical and Physical Findings and the Tuberculin Reactions in a Group of Tuberculous Children," E. D. Anderson, M.D., Consulting Pediatricist, Lymanhurst School for Tuberculous Children.

9. "Orthopedics in Tuberculous Children," Paul W. Giessler, M. D., Consulting Orthopedist, Lymanhurst School for Tuberculous Children.

10. "Incidence of Infection of Mouth, Nose,

Throat, and Ear in Tuberculous Children," Carl W. Waldron, M.D., Consulting Stomatologist and Otolaryngologist, Lymanhurst School for Tuberculous Children.

11. "Observations on the Neurologic and Mental Status of a Group of Tuberculous Children," Charles E. Nixon, M. D., Consulting Neurologist, Lymanhurst School for Tuberculous Children.

12. "The Status of the Thyroid Gland and the Basal Metabolism in a Group of Tuberculous Children," C. A. McKinley, M.D., Consultant in Thyroid Disorders.

13. "Classification and Treatment of Suspected Tuberculous School Children in Minneapolis," J. A. Myers, M.D., Chief Consultant, Lymanhurst School for Tuberculous Children.

UPPER MISSISSIPPI MEDICAL SOCIETY

The annual meeting of the Upper Mississippi Medical Society was held at Brainerd, Minn., Jan. 18, 1922. Officers were elected as follows:

President, Dr. C. G. Nordin, Brainerd, Minn.; First Vice President, Dr. M. E. Withrow, International Falls, Minn.; Second Vice President, Dr. E. E. Holman, Pine River, Minn.; Third Vice President, Dr. E. J. Pengelly, Ironton, Minn.; Secretary-Treasurer, Dr. G. I. Badeaux, Brainerd, Minn.

The delegates to the State Convention are: Dr. P. M. Hall, State Sanatorium, Minn.; Dr. G. I. Badeaux, Brainerd, Minn.

Alternates: Dr. L. M. Roberts, Little Falls, Minn.; Dr. A. E. Williams, Backus, Minn.

The following papers were read:

1. "Local Anaesthesia—Eye, Ear, Nose and Throat," Dr. C. G. Nordin, Brainerd, Minn.

Discussion: Dr. Garlock, Bemidji, Minn.; Dr. L. T. Davis, Wadena, Minn.; Dr. N. Nelson, Brainerd, Minn.

2. "Sciatica," Dr. B. I. Derauf, Brainerd, Minn.

Discussion: Dr. M. E. Withrow, International Falls, Minn.; Dr. F. L. Wilcox, Walker, Minn.; Dr. Jos. Nicholson, Brainerd, Minn.

3. "Fractured Pelvis" (Case History with Radiographs), Drs. Marcum and McAdory, Bemidji, Minn.

Discussion: Dr. Holst, Little Falls, Minn.; Dr. Beise, Brainerd, Minn.; Dr. Paul Kenyon, Wadena, Minn.

4. "Sanatorium Observations," Drs. Hall and Douglas, State Sanatorium, Minn.

Discussion: Dr. G. McL. Walde, Wadena, Minn.; Dr. C. J. Woolway, Deerwood, Minn.

Time and place of next meeting is to be decided by committee, but will probably be held sometime in May.

COMMUNICATIONS

The following letter from Dr. A. W. Daniels to his son has been submitted for publication. Dr. George F. Merritt, of St. Peter, died on October 26th, 1921. The communication throws light on the esteem in which Dr. Merritt was held by one of his many professional friends.

Pomona, Cal., Nov. 2, 1921.

"My dear son:—

"Your letter bringing the news of the death of Dr. Merritt came Monday, and it gave me a day of gloom that I could not throw off. Grateful I am that Providence so graciously cast my lot, in my life's work, by the side of a competitor of such eminent worth. Between us his half century in St. Peter was passed happily—without a break of that affectionate relationship that always existed. He rounded out a long and beneficent life, and won the honor of his Order and the profession that he lived to exalt.

"He was so fond of Bryant's Commentary on Death, that I have no doubt it had something to do with shaping his life. He often repeated it to me, when together in heart to heart conversations. It is as follows:

"So live, that when thy summons comes to join
The innumerable caravan which moves
To that mysterious realm where each shall take
His chamber in the silent halls of death,
Thou go not, like the quarry-slave at night,
Scourged to his dungeon, but, sustained and
soothed

By an unfaltering trust, approach the grave
Like one who wraps the drapery of his couch
About him, and lies down to pleasant dreams."

"I recall with pleasure his love of Humanity, his devotion to his profession, and the devoted relationship that existed for so many years between us.

"Affectionately,

—A. W. Daniels."

OF GENERAL INTEREST

Dr. and Mrs. J. L. Lynch, of Winona, are spending the winter in California.

Dr. C. R. Sanborn, of Bemidji, is in the East where he is taking a special course in medicine.

Dr. F. R. Sanderson and Miss Margaret Madden, both of Rochester, were married on January 19th.

Dr. R. M. Eppard, of Duluth, has located in Cloquet, where he will engage in the practice of medicine.

Dr. M. M. Hursh, of Grand Rapids, is in Baltimore, where he is taking a three months course in surgery at the John Hopkins Institute.

Dr. H. M. McIntire, of Waseca, has returned from Chicago where he has been taking a post graduate course in the Institute of Surgery.

On December 25, 1921, Dr. C. A. Anderson, of Rush City, secretary of the Chicago-Pine County Medical Society, was accidentally killed by a train.

Dr. Adam M. Smith, of Minneapolis, announces the removal of his offices from the Physicians and Surgeons Building to 534 Syndicate Building.

Dr. Woods Hutchinson, of New York, addressed the staff of the Mayo Clinic January 18; he discussed, "Causes of high death rates reported."

Dr. A. W. Daniels, a former resident and pioneer physician of St. Peter, celebrated his ninety-third birthday recently at his home in Pomona, California.

Dr. S. G. Cobb, of St. Paul, celebrated on January 15th the twentieth anniversary of the opening of his private hospital at Iglehart and Cleveland Avenues.

Dr. H. F. Helmholtz, Dr. R. M. Wilder, and Dr. C. Greene, of Rochester, were elected members of the American Physiological Society at the recent meeting in New Haven.

Dr. Thomas J. Kinsella (Minnesota 1919), and Dr. Edward A. Regnier (Minnesota 1921) have become members of the Nicollet Clinic, Minneapolis, in the division of surgery.

Dr. John H. Stokes of the Mayo Clinic, recently addressed Institutes in Memphis, Tennessee, and Louisville, Kentucky, as a special consultant of the United States Public Health Service.

Dr. C. O. Tanner, who was formerly a member of the Surgical Department of the Nicollet Clinic, Minneapolis, has moved to San Diego, California, where he will engage in the practice of medicine.

Dr. W. J. Kucera, of Hopkins, is spending some time in the East taking post graduate work in diseases of the eye, ear, throat and nose. Dr. F. J. Kucera, recently assistant in pharmacology at the

University of Minnesota, is taking care of his brother's practice during the latter's absence.

Dr. A. S. Hoiland, of Argyle, has gone to New York City where he will spend a year at the New York Post Graduate Medical School and Hospital taking a special course in diseases of the eye, ear, nose and throat.

At a recent meeting of the Hennepin County Medical Society the following officers were elected: President, Dr. A. E. Benjamin; Second Vice President, Dr. J. S. Reynolds; Secretary and Treasurer, Dr. R. T. LaVake.

Dr. J. C. Bloodgood of Baltimore, Associate Professor of Clinical Surgery at the Johns Hopkins Medical School, gave a Mayo Foundation Lecture, January 14; he discussed, "The present day trend of surgery and pathology and the outlook for the future."

At a meeting of the Board of Directors of the Pokegama Tuberculosis Sanatorium, Pine City, January 24, 1922, it was decided to construct a fire proof building of forty-five room capacity consisting of private rooms and small wards, and also for the housing of the laboratory, x-ray equipment, drug room and offices.

LEGISLATION

Final Enactment of the Willis-Campbell Anti-Beer Law (H. R. 7294). Adoption of the Conference Report on this measure, forbidding the manufacture and sale of medicinal beer, by the Senate on November 18, 1921, by a vote of 56 to 22, and its signature by the President on November 23rd, 1921, brought its enactment into a law. Previous to signing the bill President Harding referred it for report to the Treasury Department, which had recently issued lengthy regulations for the distribution of beer on a physician's prescription. The Secretary of the Treasury promptly gave his endorsement to the proposed act. A summary of the provisions of the law as finally adopted in both houses of Congress follows:

(a) The bill prohibits the prescribing of beer or malt liquors for medicinal purposes.

(b) Not more than one-fourth gallons of vinous liquor, or vinous or spiritous liquor separately or in the aggregate containing more than one-half pint of alcohol may be prescribed in ten days.

(c) Physicians are limited to 100 prescriptions in ninety days unless extraordinary reason is presented.

(d) The commissioner may cancel or require

change of permits to manufacture patent medicines and preparations used as a beverage even if they are unfit for beverage use, or require the formula for making extracts to be changed, or may cancel the permit, if it appears to the commissioner that the sale or use of such articles is substantially increased by reason of their use for beverage purposes.

(e) Importation of spiritous or vinous liquor is prohibited until the amount on hand shall not be sufficient to supply the current need for non-beverage purposes.

(f) Spirituous liquors exported in the original packages may be reimported in such packages for redeposit in the distillery warehouse from which originally removed.

(g) The courts of Hawaii and the Virgin Islands are given jurisdiction to enforce the National Prohibition Act.

(h) Regulations to carry this act into effect are authorized.

(i) Revenue laws relating to the manufacture, taxation of and traffic in liquor shall remain in effect when not in conflict with the national prohibition act; and the prohibitive taxes and tax penalties provided in the national prohibition act shall be collected in the same manner as other taxes on liquor.

(j) Taxes on liquor stolen or destroyed shall not be collected from the owner if the loss or theft did not occur as a result of his negligence, connivance, collusion or fraud on the part of the owner or person legally accountable for the same.

(k) Private residences may not be searched without a search warrant. Officers who without probably cause and maliciously search any place without a search warrant are penalized. Persons who impersonate officers enforcing the prohibition act are heavily penalized.

A bill to Promote Efficiency in the U. S. Public Health Service was introduced by Senator Watson of Indiana, November 22, 1921, and referred to the Committee on Finance.

This proposed legislation is similar to the measure introduced in the House (H. R. 8566) by Mr. Dyer on October 19, 1921. It provides for the commissioning in the regular service of five hundred and fifty officers of the Reserve Corps of the United States Public Health Service. A system of promotions without any change in the present pay is established. A provision fixes the term of the Surgeon General at four years and limits his selection by the president from the commissioned personnel of the service. Seven professors of the hygienic laboratory are authorized and the organization of the corps of nurses, of dietitians and reconstruction aids is inaugurated. A complete outline of the officers of each corps with the pay for each are among the important features of the measure.

MISCELLANEOUS

We take pleasure in furthering publicity to the following report of the Joint Committee of the American Gynecological Society and the American Child Hygiene Association which was appointed to consider problems on Maternal Welfare. Constructive criticism is solicited and communications should be addressed to Fred L. Adair, M. D., Chairman, 739 La Salle Building, Minneapolis.

The Committee considers its proper functions to be:

A. Elaboration of a complete scheme of maternal welfare as ideally developed, emphasizing the most important points for starting the development of such a plan with the idea of educating the public to the necessity of this work and to serve as a basis for governmental activity. The following skeleton plan is presented:

1. Preservation of life and health of the mother.
 - a. Decrease in the number of infections following abortion and childbirth.
 - b. By providing better trained attendants.
 - c. By educating the laity as to the proper preparation and necessity for proper supervision during pregnancy, etc.
 - d. Inspection and control of institutions, etc. caring for maternal cases.
 - e. Prevention and treatment of venereal disease in association with pregnancy.
 - f. Control of toxemias.

II. Increase in the number of fruitful pregnancies by

- a. Decrease in the amount of sterility.
 1. By diminution in the number of infections following abortion and childbirth.
 2. By diminution of venereal disease, especially G.C.
- b. Diminution in the number of abortions by
 1. Diminution in the number of spontaneous abortions by educating as to proper care when threatening symptoms develop.
 2. Diminution in the number of induced abortions.
 - (a) Self induced.
 - (b) Criminal operations.
 - (c) Therapeutic abortions.

N. B. (1) We recommend that hospitals require the written sanction of at least two reputable medical men before permission to perform an abortion is granted.

2. We recognize the desirability of making abortions reportable to the health authorities.

- c. Diminution of the number of premature birth deaths.
 - 1. Education and supervision.
 - 2. Provision for proper care of premature infants. Recognition and treatment of syphilis.
- d. Diminution in the number of stillbirths.
 - 1. Improvement of statistics and methods of reporting stillbirths with causes.
 - 2. Education of laity and profession.
 - 3. Provision of better antepartum and intrapartum care.
 - 4. Better care of syphilitics.
- e. Diminution in the number of neonatal deaths.
 - 1. Recognition of the importance of these deaths.
 - 2. Methods of prevention.
 - 3. Education of laity and profession.
 - 4. Provision of better antenatal, intrapartum and postpartum care.

N. B.—More careful scientific study of both stillbirths and neonatal deaths, together with causes of abortion, miscarriage and premature birth.

III. Better facilities for the care of the unmarried mother for her own protection and that of her offspring.

B. Definition of the relationship of this work to other health and welfare activities such as infant and child welfare; venereal disease campaign; anti-tuberculosis; boards of health; Red Cross and nursing activities, as well as social agencies; certain eugenic problems.

C. To have some responsible agency of representative and well qualified men to advise with the governmental agencies on the problems of maternal welfare. This may be enlarged to become a part of a sort of institution or academy of sciences which could well be an advisory body on matters pertaining to public health and welfare.

D. It is particularly important to work out problems of maternal and child welfare in cooperation with the pediatricists, by means of a joint committee representative of the leading national societies. We recommend that this joint committee on maternal welfare work with one representing the American Pediatric Society to elaborate maternal and infant welfare programs.

PROCEEDINGS OF THE MINNESOTA ACADEMY OF MEDICINE

Meeting of January 18th, 1922

Dr. H. L. Staples, presiding

Dr. A. W. Abbott presented the following case.

Mrs. H., 89 years of age. A very well-preserved old lady. Taken five days before I saw her with pain in the left lower quadrant of the abdomen. Constipation resisting all laxatives and enemas. Slight nausea, progressive weakness, pulse 100, temperature normal, W. B. C. 19,000. Rectal and vaginal examination negative. Fluoroscopy without barium showed a gas-distended colon approximately as found at the operation and a fairly distinct shadow at the point where the obstruction was found.

Abdomen opened on December 22, 1921, at midnight. The following conditions were found: large loop of descending colon and sigmoid one foot in diameter with a mesentery about eight inches long, dark purple in color. The colon within the loop was about three inches in diameter. The constriction reducing the two limbs of the colon to about one inch in diameter, consisted of a finger-like projection of omentum wrapped entirely about the colon. In addition to this there was a pedicle, like a long pedicle of an ovarian tumor which encircled the constricted area in an opposite direction to that of the omentum. The other end of this pedicle was attached to the bladder, though this was probably not its origin. After removing the omental strip it was found to be twisted on itself four complete turns. These encircling bands were released, followed immediately by the expulsion of gas and liquid feces. On further examination another pedicle with a tumor attached was found, which I show you, to the right side of the uterus.

My theory of the origin of this constriction is that the pedicle of a left ovarian tumor (which was not sought on account of the condition of the patient) first encircled the bowel, that the gradual extrusion of the bowel through the encircling pedicle gradually tended to lengthen the mesentery, and, finally, that the omental band subsequently was attracted to the injured part of the bowel. Why it should have been twisted is difficult to understand.

Dr. R. E. Farr, reported two cases and showed x-ray films.

Case 1. Jos. G., age 59, male, married. Maximal weight 170, present 125.

Present illness: Frequency, burning urination, urgency, dysuria, small stream.

History: Seven years ago began having difficulty in emptying the bladder. Later began to have frequency. Five years ago visited a well known Clinic, and had a diagnosis of cystitis made. Medicine and

irrigation relieved the condition somewhat. Two months before we saw him he began to have more difficulty in emptying the bladder, and four weeks later was once more examined, when a cystoscopic was done. A diagnosis of chronic cystitis and some disease of the sacral nerves was made.

The patient entered St. Mary's Hospital on September 9, 1921. The bladder was found distended with urine, and was emptied by the gradual method. The prostate was not enlarged. Urine contained blood and pus. A cystoscopic examination, under sacral anesthesia, showed the following: chronic cystitis, gold hole ureter on the left, contracted white meatus on the right. Ureteral catheterization resulted in the finding of blood and pus from both ureters. Pyelograms and ureterograms (plates shown) showed: double hydronephrosis, double hydro-ureter.

The right ureter was dilated by the simultaneous introduction of two catheters. After the first successful attempt it was found impossible to introduce an instrument of any kind into the left ureter. The patient was drowsy and uremic from the time he entered the hospital, and the phthalein output varied from day to day, averaging between 20 and 40 per cent.

After dilatation of the right ureter the patient improved somewhat. On October 15th, a suprapubic cystostomy was done under local anesthesia, which had been preceded by sacral anesthesia. The right ureter was widely dilated with a series of urethral sounds. An effort was made to enter and dilate the left ureter, but it was unsuccessful, and, on account of the patient's condition, further operative measures were not attempted.

On November 5th, almost two months after entrance, the left ureter was exposed under local anesthesia, and an effort made to introduce an instrument into the bladder, from above through the ureter. This effort being unsuccessful, a dressing forceps was introduced through the cystostomy wound and made to impinge upon the bladder fundus, which was then incised and a catheter drawn through, with its end projecting through the cystostomy wound. The ureter was then opened at a favorable point above the stricture and the upper end of the catheter inserted well into the dilated portion of the ureter. A vesico-ureteral anastomosis was thus established by anchoring the ureter to the bladder wall with chromicized gut. The first ureteral incision was then closed and the incision in the abdominal wall closed, with cigarette drains.

From this time the patient rapidly recovered. The catheter was withdrawn in ten days and the suprapubic wound healed. Our last report of the patient showed he had gained 35 pounds, now weighing one hundred and sixty.

Case 2. Frank K., age 11, male. Entered St. Mary's hospital, November 18, 1921.

History: At 3:30 p. m. while partially lying down

on a couch and reading, a boy companion shot him with a Number 22 rifle. The bullet entered the left upper abdomen just below the diaphragm in the axillary line and lodged in the opposite side in the right flank, above the iliac crest. The boy was seen in consultation at 9 o'clock p. m., and was operated upon as soon as the operating room could be prepared.

Infiltration anesthesia, transverse incision, cutting off both recti. The stomach showed a perforation in the greater curvature at the left side. The perforation was closed with catgut. The stomach showed another perforation in the lesser curvature two inches above the pylorus. A third perforation showed in the lower surface of the duodenum. From here the bullet traversed the transverse colon, which showed two perforations, and lodged in the abdominal wall. A thorough search was made for a fourth perforation in the stomach and duodenum, but no other opening could be found.

Drainage was used in the greater and lesser peritoneal cavities and the boy made a fair recovery, although he developed considerable fever and there was a good deal of discharge of pus from the drainage openings. The patient felt fine up to the 12th day, when he became pale, and his pulse rapid, rising to 100, 120, and finally to 140. He passed a large black, tarlike stool. His pulse then dropped to 110. A few hours later he began to vomit red blood, and was given a transfusion of 450 cc., the father acting as donor, the citrate method being used. The pulse dropped to 100 and his condition seemed satisfactory in every way. The next night, practically thirty-six hours after the first hemorrhage, he went into collapse, and had every evidence of internal hemorrhage. A second transfusion was made, a similar amount being used, but from a different donor. During the administration of the blood there was considerable reaction. The patient felt chilly, the pupils became moderately dilated, and he had some disturbance of respiration. The introduction was made slowly, and the child quieted down and seemed to take the last portion of the blood without any disturbance. The patient collapsed a few hours later and died suddenly. Whether the patient died of hemorrhage, or anaphylaxis, or both, could not be positively decided.

Autopsy showed the abdominal wound healed, excepting at one point, where drainage was still taking place. The peritoneal cavity contained some fluid. There was only slight evidence of peritonitis about the field of operation. The liver edge contained a small abscess. Both pleural cavities contained dark colored fluid.

The interesting point about this case, and my reason for reporting it, is to call attention to the reason why but three openings were found in the peritoneal wall of the stomach. The bullet entered the greater curvature on the left, traversed the mucous membrane of the lesser curvature, where it dipped down

and caught the serous surface of the stomach. It did not leave the stomach, but traveled on beneath the mucous membrane, leaving the stomach through the pyloric opening, emerging again through the duodenum, thus making but three wounds in the serous coat. The gastric hemorrhage occurred from a large ulcerated surface in the mucous membrane, where the bullet had pierced it. The stomach was found full of blood at autopsy, and below the stomach many feet of intestine were empty and collapsed, while the colon and lower ileum were completely filled with blood, evidencing the fact that the child had had two separate hemorrhages.

Comments: Under similar conditions it would perhaps be advisable to enlarge the bullet wound and more carefully suture the layers of the stomach wall; and, furthermore, as the ulcerated surfaces are perhaps the result of digestive processes, neutralization of the gastric contents during convalescence might seem advisable in these cases.

Dr. Walter R. Ramsey reported the following case.

I would like to report a case of meningitis in a boy, which the pathologist pronounced pneumococcus meningitis. If it was that, it is perhaps the first one on record to get well.

I saw him first on Christmas afternoon. Patient was a little Italian boy, apparently suffering from meningitis. His head was markedly retracted. We did a lumbar puncture at his home in the Italian quarter. The fluid was very turbid. Sent him directly to the City Hospital and Dr. Stewart and I examined the fluid. The next day we sent him to the contagious service at the City Hospital so he was out of my hands, but I called up the next day to find out about the report and the pathologist said at once that it was the pneumococcus type and gave the child four days to live. When I went on service again January 1st the boy was back on the children's service, having been transferred from the contagious ward. The little fellow was sitting up and apparently quite normal. The pathologist insists that it was the pneumococcus. We have sent some of the fluid to other places for examination, because if it was the pneumococcus it is a rare case. Dr. Holt reports a case which apparently recovered but died three months later, and when Dr. Apt was here recently I asked him about it and he said he had seen one get well but that there was still some discussion regarding the diagnosis.

The next case I wish to report is a case of suddenly enlarged thymus. Young baby 8 or 9 months old and a very healthy normal child. Suddenly seized with dyspnea. The next day Dr. Stewart saw the child, who was a patient of Dr. Geist, and the picture presented was very interesting. The baby was breathing only very superficially, there being little or no movement over the right chest and very little on the left. No respiratory murmur on the

right side and very little on the left. Baby was extremely pale.

I felt sure it was a case of enlarged thymus and, knowing what wonderful results we get in asthma with adrenalin, I suggested that we give the baby 5 minims of it. Much to our surprise, in 10 or 15 minutes that baby was breathing immensely better. We followed that with very marked restriction of all fluid, and the child has quite recovered.

This exactly fits in the picture which other authors have described which proved to be enlarged thymus. I have not seen the use of adrenalin advocated before but it certainly acted like magic.

Dr. J. T. Christison reported a case of pneumococcic meningitis complicated by acute appendicitis with recovery.

The patient, a boy 4 years of age, was taken ill October 26th with vomiting and headache. The following day his mother noticed retraction of the head and thought his eyes were converged. He was admitted to the hospital on October 30th with marked retraction of the head and a temperature of 102 degrees.

Examination of the urine showed a trace of albumin and a few hyalin casts. The leucocyte count at this time was 25,900. An examination of the spinal fluid showed a cell count of 2,100 per cu. mm. Differential: p. m. n. 82 per cent; lymph. 15 per cent; and transitionals 3 per cent. A culture of this on broth showed the infecting organism to be a pneumococcus.

On the day of admission following the spinal puncture 15 c.c. of anti-meningococci serum was administered, and on the following day 15 c.c. of anti-pneumococcic serum was administered intraspinally, and 20 c.c. intramuscularly. On the following day 15 c.c. of anti-pneumococcic serum was administered intraspinally and 35 c.c. intramuscularly. On November second 15 c.c. of anti-pneumococcic serum was administered intraspinally. The child up to this time had been receiving continuous proctoclysis. From November 3rd to November 11th nine spinal punctures were done, and cultures made from each gave no growth. On the evening of November 12th the child complained of abdominal pain and when seen the following day there was marked rigidity of the right rectus muscle with pronounced tenderness, and a diagnosis of acute appendicitis was made. At 2:15 the same afternoon Dr. Zimmerman opened the abdomen and found an appendicial abscess containing about two ounces of thick yellow, foul-smelling pus. Culture from this also showed the presence of pneumococci. Recovery from this date was uneventful, and the child left the hospital on December 15th and has remained well.

Dr. E. T. F. Richards read a paper entitled "An Electrocardiographic and Clinical Investigation of the

Therapeutic Value of Camphor," by E. T. F. Richards and Dr. R. Edwin Morris.

Discussions by Dr. Morris, Dr. S. M. White, Dr. F. W. Schultz, Dr. W. A. Jones, and Dr. Richards.

Dr. Morris:

The experimental work for this paper was done at the University of Minnesota on the same basis as the digitalis work we have carried on for some years, using the Hatcher-Brody cat method of biochemic standardization, modified to our use, and graphically recording the cardiac, respiratory and blood pressure changes as they occur. The animals are attached to tables, anesthetized just sufficiently to keep them quiet. A normal record is made, then the solutions are introduced into the femoral vein at a definite rate, and other records are frequently made noting any change in the action of heart or respiration. Notation is made of the various events as they occur.

The marked feature observed in the camphor series were the twitchings, the convulsive seizures and then the toxic period in which there appears complete heart block; respiration stopping first, the ventricles stopping before the auricles and exhibiting periods of ventricular fibrillation with gradual periods of ventricular "stop," the auricles continuing for some time as evidenced by the graphic records. In a number of animals unsuccessful attempts were made to restore cardiac action by various methods.

It was surprising to note the amount of cotton seed oil which, used as a control, could be injected without any evidence of embolus or injury. The animal would be saturated with oil which, on autopsy, appeared in every organ. The camphor solutions had a distinct camphor action, only slower in producing the lethal period.

From this work we can say definitely that camphorated oil does not produce cardiac stimulation; given in greater doses it produces definite toxicity. It has no definite place among stimulants. The use of camphorated oil in pneumonia has given no real results and the consensus of opinion is in accord with the report of Glaukner (Calif. State Med. Jour., May 1920) who reports its use in 50 cases as "no better results with use of camphorated oil than in series of cases without its use, the mortality 29 per cent in both series."

One observation made in these experiments was the action of camphor in making animal blood coagulate much more rapidly. I find in "Zeitschrift fur TB," August 1920, p. 276, Zehner reports camphorated oil (20%) "a sovereign means of arresting hemoptysis, in doses of 15 to 30 gms."

Dr. S. Marx White:

The Academy is to be congratulated on having a paper of this character read before it.

As this type of work has been carried on in recent years one after another of our therapeutic idols seem to have fallen, and camphor also, as a cardiac stimulant, must be relegated to the discard. One

point of interest is the clear way in which the animal experiments bring out the toxic and fail to reveal a stimulating action of camphor.

The clinical test, or the careful application of criteria such as were applied by the essayists to the clinical part of the problem, is of much greater value in its solution than are the animal experiments. The Electrocardiograph is limited in the information it can give but it does give definite information of a depressant action, or what Dr. Morris called a toxic action of camphor. But caution must be exercised in the transference of the results of animal experimentation to man. The animal experiment may guide us in our studies in man but it must not supplant the study in man, nor should we be led into a wholesale acceptance of the results of animal experimentation as transferable to man. This erroneous process has frequently led us into error and it led us into a serious error many years ago in the case of digitalis. Animal experiments at that time showed that toward the end of a period of administration of lethal doses of digitalis in animals there was a distinct rise in blood pressure. For a long time it was thought that such a rise in blood pressure occurred in the therapeutic use of digitalis, but it was not until Eggleston four years ago studied the problem clinically that it was shown that no considerable rise in blood pressure occurred in man with the therapeutic use of the drug.

The study of digitalis as it has been made by cardiologists with the use of the electrocardiograph has given us this information, that digitalis has a depressing action on certain functions of the heart principally on the function of conduction of stimuli, and because it does depress this function it has found a very legitimate field in heart therapy, i. e., in auricular fibrillation. Much of our use of digitalis in the past has been on a basis of false understanding of its effects. Withering, who rescued the drug from the herb doctors of his time and gave it to the medical profession, probably used it more intelligently and with clearer indications than his successors of the past century. It is only since the pharmacologist and the electrocardiographer have cleared it of much of its mystery that clear indications for its use have again emerged. A heart murmur is no longer an indication. It is so with many other drugs now being subjected to scrutiny.

So our therapeutic problem is being surrounded here and there and forms of evidence are being secured that we can actually rely on.

Dr. F. W. Schultz:

Several years ago I carried out some experimental work on the action of camphor on dogs who had been starved for a definite period. It seemed to me that the toxic symptoms occurred more readily the longer the dog was starved. There seemed to be a definite ratio between the period of starvation and the development of the symptoms. I did not have the use of an electroradiograph at that time. This instru-

ment was then almost unknown, or, at any rate, very little used.

I had a little interesting personal experience in Europe while I was doing some experimental work there. I took two cubic centimeters of camphor in oil before breakfast, and in a comparatively short period developed rather alarming symptoms, so much so that the hospital authorities became quite concerned. My skin became cold and clammy. There was marked nausea, dilated pupils, my hands were very unsteady so that I could not write for several hours, and the gait became staggering. There was profound depression for a considerable time. The symptoms then subsided, and left no ill effects after six or seven hours.

These symptoms may have been due to an idiosyncrasy to the drug, but I surely had a definite impression at the time that camphor was a drug capable of producing rather pronounced symptoms and that its use was probably not altogether harmless.

Dr. W. A. Jones:

Before pronouncing the final eulogy on camphor and congratulating Drs. Richards and Morris and other noted authorities on digging the grave and filling it in so that camphor may die, I should like to ask that Dr. Richards be permitted to tell us the effect of spirits of camphor put on the handkerchief of the old lady.

Dr. Richards:

Our work on the effect of camphor on emaciated animals is confirmed by the work of Dr. Schlutz, and for that reason the drug should not be administered to patients who are at all emaciated.

I rather think that Dr. Jones question is answered by those who believe that there is a reflex vasomotor effect and that we may get such effects from camphor.

NEW AND NON-OFFICIAL REMEDIES

During January the following articles have been accepted by the Council on Pharmacy and Chemistry for inclusion in New and Nonofficial Remedies:

The Abbott Laboratories:

Butyn.

G. W. Carnrick Co.:

Solution Post-Pituitary.

Parke, Davis and Co.:

Pituitrin "O".

NEW AND NONOFFICIAL REMEDIES

Liquid Petrolatum-Squibb, Heavy (California).—A brand of liquid petrolatum—U. S. P., made from California petroleum and claimed to be composed essentially of hydrocarbons of the naphthene series. For a description of liquid petrolatum, see the U. S.

Pharmacopeia and Useful Drugs. E. R. Squibb and Sons, New York.

Chaulmoogra Derivatives.—Chaulmoogra oil is a fixed (fatty) oil. In addition to small quantities of the glycerides commonly found in fats, chaulmoogra oil contains the glycerides of a series of highly unsaturated fatty acids, chiefly chaulmoogric acid and hydrocarpic acid. The therapeutic properties of chaulmoogra oil appear to be due to these unsaturated fatty acids. Chaulmoogra oil is used in the treatment of leprosy, the bulk of the evidence indicating that it is of value though it does not have specific curative properties. Chaulmoogra oil is given by mouth or hypodermic injection. The sodium salts of the fatty acids of chaulmoogra oil and the ethyl esters prepared from these fatty acids have been used in the treatment of leprosy with claims that they are better tolerated than the oil.

Chaulmoogra Oil.—**Oleum Chaulmoograe.**—For actions and uses, see the preceding article "Chaulmoogra Derivatives." The dose is 0.3 Cc. (5 drops) in capsules, three times daily, the dose being increased to the point of tolerance. For hypodermic injection it has been used mixed with olive oil.

Chaulmestrol.—Ethyl esters of the fatty acids of chaulmoogra oil. For a discussion of the actions and uses, see the preceding article "Chaulmoogra Derivatives." Orally, chaulmestrol is administered in gradually increasing doses of from 1 Cc. to 5 Cc. Intramuscularly, 1 Cc. is the initial dose. The Bayer Company, New York (Winthrop Chemical Company, Inc., New York, distributor). (Jour. A. M. A., Jan. 14, 1922, p. 111.)

Food Allergens-Squibb.—Powders representing the protein of foods. For action, uses and dosage, see general article, "Biologically Reactive Food Proteins," New and Nonofficial Remedies, 1921, page 65. The following allergens have been accepted: Almond Allergen-Squibb, Barley Allergen-Squibb, Brazil-Nut Allergen-Squibb, Buckwheat Allergen-Squibb, Butternut Allergen-Squibb, Chestnut Allergen-Squibb, Corn Allergen-Squibb, Filbert Allergen-Squibb, Hazelnut Allergen-Squibb, Hickory-Nut Allergen-Squibb, Oat Allergen-Squibb, Peanut Allergen-Squibb, Pecan Allergen-Squibb, Rice Allergen-Squibb, Rye Allergen-Squibb, Walnut (Black) Allergen-Squibb, Walnut (English) Allergen-Squibb, Wheat Allergen-Squibb, Apple Allergen-Squibb, Artichoke Allergen-Squibb, Asparagus Allergen-Squibb, Banana Allergen-Squibb, Blackberry Allergen-Squibb, Black Pepper Allergen-Squibb, Bean (Lima) Allergen-Squibb, Bean (Navy) Allergen-Squibb, Bean (String) Allergen-Squibb, Beet Allergen-Squibb, Cabbage Allergen-Squibb, Cantaloupe Allergen-Squibb, Carrot Allergen-Squibb, Celery Allergen-Squibb, Cherry Allergen-Squibb, Coffee Allergen-Squibb, Cucumber Allergen-Squibb, Eggplant Allergen-Squibb, Grape Allergen-Squibb, Grapefruit Allergen-Squibb, Lettuce Allergen-Squibb, Mustard Allergen-Squibb, Onion Allergen-Squibb, Orange

Allergen-Squibb, Parsnip Allergen-Squibb, Pea Allergen-Squibb, Peach Allergen-Squibb, Pear Allergen-Squibb, Plum Allergen-Squibb, Potato (Sweet) Allergen-Squibb, Potato (White) Allergen-Squibb, Prune Allergen-Squibb, Radish Allergen-Squibb, Raspberry Allergen-Squibb, Rhubarb Allergen-Squibb, Spinach Allergen-Squibb, Squash Allergen-Squibb, Strawberry Allergen-Squibb, Tomato Allergen-Squibb, Turnips Allergen-Squibb, Watermelon Allergen-Squibb, Beef Allergen-Squibb, Bluefish Allergen-Squibb, Chicken Allergen-Squibb, Clam Allergen-Squibb, Codfish Allergen-Squibb, Crab Allergen-Squibb, Goose Allergen-Squibb, Haddock Allergen-Squibb, Halibut Allergen-Squibb, Horse Allergen-Squibb, Lamb Allergen-Squibb, Lobster Allergen-Squibb, Mackerel Allergen-Squibb, Mutton Allergen-Squibb, Oyster Allergen-Squibb, Pork Allergen-Squibb, Salmon Allergen-Squibb, Shrimp Allergen-Squibb, Sweetbreads Allergen-Squibb, Turkey Allergen-Squibb, Veal Allergen-Squibb, Milk (Cow) (All Proteins) Allergen-Squibb, Milk (Goat) (All Proteins) Allergen-Squibb, Milk (Human) (All Proteins) Allergen-Squibb, Milk (Cow) (Casein) Allergen-Squibb, Milk (Cow) (Albumin) Allergen-Squibb, Egg (White) (All Proteins) Allergen-Squibb, Egg (Yolk) (All Proteins) Allergen-Squibb, Egg White Albumin Allergen-Squibb, Egg (Whole) (All Proteins) Allergen-Squibb, Wheat (Gliadin) Allergen-Squibb, Orris Root Allergen-Squibb. E. R. Squibb and Sons, New York (Jour. A. M. A., Jan. 21, 1922, p. 192).

Pollen Protein Allergens-Squibb.—Powders consisting of the sodium chloride-soluble protein of the isolated pollen from various species of plants. The Pollen Protein Allergens-Squibb are intended only for diagnosis. For action, uses and dosage, see general article, "Pollen Extract Preparations," New and Nonofficial Remedies 1921, page 239. The following allergens have been accepted: Corn Pollen Allergen-Squibb, Goldenrod Pollen Allergen-Squibb, Orchard Grass Pollen Allergen-Squibb, Ragweed Pollen Allergen-Squibb, Rye Pollen Allergen-Squibb, Timothy Pollen Allergen-Squibb, E. R. Squibb and Sons, New York (Jour. A. M. A., Jan. 21, 1922, p. 192).

Neocinchophen-Abbott.—A brand of neocinchophen—N. N. R. For action, uses and dosage, see New and Nonofficial Remedies, 1921, p. 86. The Abbott Laboratories, Chicago (Jour. A. M. A., Jan. 21, 1922, p. 192).

PROPAGANDA FOR REFORM

Heliotherapy and Rickets.—Evidence for the value of heliotherapy in rickets was presented years ago. This value has recently been verified by experiments on animals rendered demonstrably rachitic through dietary errors. When rats have an abundance of sunlight, they remain healthy under regimens which are sufficiently deficient in phosphorous to induce rickets in animals kept in subdued light. It has

been shown that the change produced by sunlight on the skeleton do not differ in any important respect from the changes produced when animals are fed cod liver oil. Again, sun treatment of infants suffering from rickets, not only brings about a cure of the rachitic lesions, but in so doing occasions chemical changes in the blood similar to those noted when the cure is effected by cod liver oil. Heliotherapy has thus in one case at least been put upon the scientific basis of demonstrable chemical changes in the organism affected (Jour. A. M. A., Jan. 21, 1922, p. 195).

Western Medical Association Treatment for Epilepsy.—The Western Medical Association, Chicago, is selling a mail-order treatment for the alleged cure of epilepsy. The A. M. A. Chemical Laboratory examined the "Treatment" and found the essential constituent to be phenobarbital (luminal). The Laboratory reports that the "Treatment" is sold in three boxes, A, B and C. "A" contained tablets, each of which represented 0.66 gm. (1 grain) of phenobarbital (luminal), "B" contained tablets which are of the type sold by pharmaceutical houses as "digestive tablets" and contained pepsin, pancreatin and calcium lactophosphate, "C" contained tablets which gave tests for emodin-bearing drugs and for aloin. In addition to the epilepsy treatment, the Western Medical Association also sells a number of other nostrums for the treatment of various diseases. Apparently, two men are mainly concerned in operating the Western Medical Association, namely, Joseph B. Creevy and Dr. W. W. Lister, a physician (Jour. A. M. A., Jan. 28, 1922, p. 296).

Antidote for Phenol Poisoning.—Sodium sulphate in strong solution is one of the best known antidotes for phenol poisoning. The action is not a chemical one. Alcohol is not an antidote for phenol poisoning. Experiments carried out in the U. S. Hygienic Laboratory showed that the toxicity of phenol was increased by alcohol. Alcohol is applied to the appendix stump after operation in the belief that it will neutralize the action of the phenol and thus prevent extensive sloughing of the tissues; but no doubt the action of the alcohol is simply that of diluting and washing away the phenol (Jour. A. M. A., Jan. 28, 1922, p. 299).

Pinuseptol.—According to the catalog of Eli Lilly and Company, Pinuseptol is a "Pine Oil Disinfectant." The Bureau of Chemistry of the U. S. Department of Agriculture has investigated the general subject of the use of pine oil as a disinfectant. It reports that emulsions made from pine oil when freshly prepared give a Hygienic Laboratory phenol coefficient of from 3.42 to 4.34. It was found that pine oil emulsions failed to kill *M. aureus* and *B. anthracis*; the government chemists conclude that these products should not be used for general disinfecting purposes (Jour. A. M. A., Jan. 28, 1922, p. 299).

PROGRESS

Abstracts to be submitted to Section Supervisors.

MEDICINE

SUPERVISORS:

F. J. HIRSCHBOECK,
DULUTH CLINIC, DULUTH

THOMAS A. PEPPARD
LA SALLE BLDG., MINNEAPOLIS

EPINEPHRIN HYPERSENSITIVENESS AND ITS RELATION TO HYPERTHYROIDISM: Peabody, Sturgis, Tompkins and Wearn. (*Amer. Jour. Med. Sc.*, April 1921.) The authors have made an effort to establish the specificity of the Goetsch test in hyperthyroidism. They believe that with properly selected dosage and proper criteria for estimating the response, they can differentiate rather well so called "negative" and "positive" reactions, although in certain instances "doubtful" reactions are obtained. The nature of the reaction is unknown, but it seems to be due to a stimulation of the sympathetic nervous system by the epinephrin. Theoretically, a "positive" reaction would indicate hyperactivity of the thyroid, of the adrenal gland or of the sympathetic nervous system, or a lowered threshold of response of the sympathetic system. These conditions, however, with the exception of hyperthyroidism, are largely hypothetical, but yet they probably do occur, so that varying causes may account for a positive reaction. They find that the reaction is not invariably found, even with a clinical picture of hyperthyroidism or with increased basal metabolic rates. They also found a hypersensitiveness in persons who had no hyperthyroidism; for example, in 50 per cent of patients convalescent from acute infections, in psychoneurotics, and in soldiers affected with "effort syndrome," as well as in 14 per cent of apparently normal young men. A positive reaction appears to occur most often in nervous individuals, but is not constant. The clinical significance of the reaction is not definite, and cannot at the present time be regarded as having specific significance in the diagnosis of hyperthyroidism.

F. J. HIRSCHBOECK.

AN AUSCULTATORY SIGN OBSERVED IN ACUTE ABDOMINAL DISEASES: Paul W. Aschner. (*Amer. Jour. of Med. Sc.*, Nov. 1921.) The writer has employed stethoscopic auscultation on the abdomen in acute cases, mostly appendicitis, believing that some information might be obtained therefrom. His

conclusions are drawn from findings in twenty cases observed by himself.

On patients presenting these auscultatory signs, it was found that the peritoneal cavity when open contained free pus, sero-purulent fluid or blood (the latter in a case of ruptured tubal pregnancy). The findings were not found in ascites uncomplicated by any inflammatory factor. It was also tried in patients in the Surgical ward without abdominal disease, and in no instance was the sign encountered, although occasionally heart sounds were audible in the epigastrium, but not as universally as in the acute abdominal cases.

The technique of the test is simple. A stethoscope is employed in the four quadrants of the abdomen, and the heart sounds and inspiratory murmurs listened for. In seventeen cases the auscultatory sign was positive, in two or more quadrants, which the writer believes a characteristic feature, with positive corroboration at operation. In a recent case of acute perforating appendicitis, with free pus in the abdominal cavity, the reviewer has found the sign to be positive, and further observation may prove the test to be of some value as a differential diagnostic aid.

F. J. HIRSCHBOECK.

DIAGNOSIS AND CLINICAL MANIFESTATIONS OF CARDIOSPASM ASSOCIATED WITH DIFFUSE DILATATION OF THE OESOPHAGUS: Smithies. (*Am. Jour. Med. Sc.*, Sept. 1921, p. 313.) The author reports his observations during the past seven years on seventy-six cases of cardiospasm associated with diffuse dilation of the oesophagus. He differentiates "spasm at the cardia" which is a transitory spasm and is not associated with dilatation of the oesophagus, from true cardiospasm. The latter is characterized by strong and prolonged contraction of the cardiac sphincter, accompanied by hypertrophy of the cardiac ring and resultant diffuse dilatation and sacculation of the lower end of the oesophagus. The oesophageal wall is usually thickened, due to actual work, hypertrophy, and frequently, ulceration or disease of the mucosa is present. A good description of the symptomatology is given. The quantity and danger of bouginage with an unguided force in cases where the lower portion of the sac lies below the level of the cardiac sphincter is pointed out. The importance of the silk thread as a guide to the bougie or dilation force is emphasized. Fluoroscopy and Roentgenograms in different positions are of great importance in the diagnosis of cardiospasm, but the evidence is not infallible. Clinical and functional recovery is reported in 70 per cent of cases following divulsive treatment; improvement occurs in 20 per cent; about 10 per cent are not permanently benefited by any form of treatment and for these gastrostomy may be required to save life.

P. H. ROWE.

SURGERY

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VERNE C. HUNT,

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AN ANALYSIS OF 102 CASES OF TUMORS OF THE BREAST: Randolph Winslow, (Ann. Surg. Sept. 1921.) The author in 1911 tabulated 100 cases of lesions of the breast, occurring in the University Hospital, Baltimore, and found that 63 were carcinomata, 3 sarcomata, 20 fibro-adenomata, 1 pericanalicular myxoma, 5 cystic fibro-adenomata, 2 galactoceles, 3 tubercular mastitis, and 3 abscesses.

The incidence of carcinoma compared with all other tumors of the breast is between 60 per cent and 80 per cent as shown by most observers. In a series of 102 cases of lesions of the breast observed at the University Hospital during 1917, 1918, and 1919, 61 were carcinomata, 3 sarcomata, 18 benign solid growths and 20 benign cystic growths.

Of the 61 carcinomata six cases occurred before 35 years of age, the youngest was 23 years old. The tumor was located in the upper and outer quadrant in twenty-two cases, upper and inner quadrant four cases, lower and outer four cases, lower and inner one case, central three, general eight, and the rest not recorded.

From his analysis the author concludes in part, that he is still of the opinion that carcinoma is the predominant neoplasm of the mammary gland and that it occurs in from 60 to 65 per cent of all mammary tumors. Sarcoma occurs in about three per cent of tumors of the breast, is malignant and should be treated in as radical a manner as a carcinoma. Non-malignant neoplasms occur in about 35 per cent of all cases. No woman should be allowed to harbor a neoplasm in her breast whether it be benign or malignant, or whether the patient is old or young. Benign tumors tend to become malignant, and the time to remove them is while they are still benign.

V. C. HUNT.

THE SURGICAL TREATMENT OF ACUTE PELVIC INFECTIONS IN WOMEN: F. G. Dubose, (Surg. Gyn. and Obst., Sept. 1921, Page 299-307.) It is estimated that seventy-five per cent of invalidism in women arises from pelvic infection. The author urges earlier and more radical operative treatment in this disease, especially in acute exacerbations and in the primary attack.

Recurrence of pelvic abscess after drainage through the cul-de-sac has been the rule; such procedure draining but one of the many pus pockets in the pelvis.

The author is prompted to do very radical surgery

in these cases instead of waiting and adds that however much the cul-de-sac is bulging with pus, the patient is operated upon through a median lower abdominal incision, so that all the diseased tissue can be examined and treated surgically.

Pus pockets by no means regularly become sterile. Years after the onset of the infection many of these cases develop acute, spreading, or general peritonitis. The greatest error in the operative treatment of these cases is insufficient surgery and inadequate drainage. The author believes that the mortality and morbidity following the nonoperative, the expectant plan, and the conservative-surgical is high.

The author's plan for the treatment of these cases follows: Immediate operation is done on all cases which present the syndrome of acute surgical pelvis, if first seen within twelve hours after the onset of the infection. If first seen twelve or more hours after onset a varying period of some hours of observation is followed, during which time absolute rest is given the patient, as compatible as possible with the routine and repeated examinations. During this time the most minute and painstaking examinations are made to determine the general condition of the patient. These examinations include blood count, bacterial examination to determine the type of organism one is combating, and any others that may throw light on a remote or complicating disease such as the x-ray and cystoscopic examination. During this time the patient is supported by proctoclysis and hypodermoclysis of saline solutions containing glucose. In the most acute cases, if seen before the eighth day after the onset, the author advises deferring of operation:

1. If the condition is apparently stationary or the symptoms take a more favorable turn during the six or twelve hours consumed in the preliminary study of the case;

2. When the blood examination reveals a high polymorphonuclear count without an accompanying leukocytosis or in the absence of an increasing number of leukocytes;

3. From the third to the seventh day after onset—when the severity of the peritonitis is at its height and the rest method is being given a chance to have effect—then the operation should be withheld in the absence of an exigency until the more acute general symptoms have subsided.

Do not defer operation:

1. In the presence of a progressive exaggeration of unfavorable symptoms during the period of rest, observative and expectant treatment;

2. If there is sudden relief of pain with a subjective sense of improvement, accompanied by an acceleration in pulse rate and frequently by a lowering temperature, usually indicating thrombosis or rupture of a localized abscess.

3. When there is a sudden fall in a previously high leukocyte count or a decreasing number of

leukocytes and an increasing percentage of polymorphonuclears, which indicates a falling resistance.

4. When more than a week has elapsed since the onset of the infection, for the blood during this period of time will have developed, in all probability, a degree of immunity to the limit of its opsonic power.

5. When a mass appears in the pelvis—evidence of the localization of the infectious process by adhesions within a circumscribed area.

The technique of operating on cases of pelvic infection is given by the author, who lays special stress on certain features.

Pelvic debridement is urged, at least the pyogenic membranes with infected tubes, uterus and ovaries should be removed. Gauze packs are applied over denuded pelvic surfaces to stop oozing and to hinder capillary absorption. Eroded or denuded intestinal surfaces are peritonized or overlaid with omentum. Rubber dam covers the gauze packs and the pelvic operative field, minimizing the formation of adhesions and drawing freely and continuously.

In 255 pelvic inflammatory cases operated upon consecutively there was one death. One hundred and sixty-three have been followed up, of which 137 or 84 per cent are cured; 18 or 11.1 per cent are improved; 8 or 4.9 per cent not improved; average hospital days 23.3, including one neurotic, who spent 109 days in hospital.

Case reports, tables of one hundred and sixty-three cases whose post-operative course has been followed and an axiomatic review in parallel conclude the article.

FRED R. SANDERSON.

GYNECOLOGY AND OBSTETRICS

SUPERVISORS:

ARCHIBALD L. McDONALD,
FIDELITY BLDG., DULUTH.

ALBERT G. SCHULZE,
LOWRY BLDG., ST. PAUL.

A PRELIMINARY REPORT ON THE TREATMENT OF SYPHILIS COMPLICATING PREGNANCY. A. C. Beck. (The Am. Jour. Ob. and Gyn., Vol. II, No. 4.) This report includes a small group of cases which have been carefully studied, and brings out several striking points.

Diagnosis: A history of previous lesions and the physical examination gave the correct diagnosis in only six cases or 18 per cent. The history of previous pregnancies was suggestive, since over 60 per cent had had previous miscarriage, stillbirths, or had given birth to a living syphilitic fetus. The routine Wassermann must be carefully checked by repeated tests. The microscopical examination of the placenta is most important.

Treatment: Each patient received weekly injections of salvarsan, 4 decigrams with mercury for six

weeks, followed by mercury for six weeks more. The entire course was repeated if the Wassermann remained positive. It is necessary to check the urine carefully during treatment. The newborn babies receive daily mercury rubs for two months. If the Wassermann is then negative no further treatment is given except in case of definite indications. The babies whose mothers had received incomplete prenatal treatment require more intensive therapy.

Results: Four cases received no treatment and gave birth to; one healthy living baby and three living syphilitic babies. Eleven patients received from one to three salvarsan injections; there were five living healthy babies, three living syphilitic and three dead syphilitic babies. Seventeen patients received five or more injections of salvarsan of which fourteen bore healthy living babies, two living syphilitic, and one dead syphilitic baby.

ARCHIBALD L. McDONALD.

PEDIATRICS

SUPERVISORS:

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ROY N. ANDREWS,
MANKATO CLINIC, MANKATO.

THE SPECIFIC TREATMENT OF DIPHTHERIA

E. C. Fleischner, and E. B. Shaw. (Arch. of Ped., Oct. 1921). Following the work of Schick in 1913 the relative immunity to diphtheria at different ages has been constantly proven. Within individual limits the susceptibility to the disease under five years of age is very great. The mortality from diphtheria depends absolutely upon the rapidity with which the diagnosis is established and the promptness with which proper and effective treatment is instituted. The layman should be taught to consider all sore throats diphtheritic until they are proven otherwise. The physician should automatically take a culture in the presence of an exudate, however small. The clinical picture in incipient tonsillar diphtheria may be one that the most skilled diagnostician cannot differentiate without the aid of the laboratory. Chronic or acute nasal discharges, particularly when bloody in character, are also potentially due to the Klebs-Loeffler bacillus until proven otherwise. Progressive aphonia with a cough coming on acutely, particularly in children under two years of age, should be accepted as evidence of a probable diphtheritic infection and treated as such. One of the most reprehensible forms of neglect is that in which the treatment of evident clinical diphtheria is delayed, either because the report on the culture has not been made, or having been made and not found, too much credence is given to the value of the negative diagnosis. In a general way the rule may be made that culture taking can only be satisfactory when the operator sees exactly what he is doing, and

does not dig at the throat, as is only too frequently the custom. Cultures taken in this way are more reliable but even then they cannot always be depended upon. Medical advisors, whose patients recover when the administration of the antitoxin is delayed and the dose too small, should not delude themselves as to their efficiency. The natural antitoxin in the blood stream of the sick child has only too often protected the patient against the ignorance of a poor practitioner.

Twenty thousand units of antitoxin subcutaneously are necessary to produce the same effect in preventing the development of a positive Schick, as is achieved by 1,000 units intravenously. It would seem as if very little further argument were necessary to prove the statement, that the prognosis in any case of diphtheria depends upon the rapidity with which antitoxin can be made available to the tissues.

The successful treatment of diphtheria depends absolutely and unequivocally upon the earliest possible administration of sufficient antitoxin by that method whereby it can be made most readily and most rapidly available to the tissue cells. This is accomplished by the intravenous method. When this intravenous method cannot be used, from twice the amount in the mild cases to four times the amount in the severe cases should be given in a single injection by the intramuscular method. The subcutaneous injection of antitoxin should never be used in the treatment of diphtheria. Mild and early cases should be kept in bed two weeks. Severe and late cases should be kept in bed from four to eight weeks, depending upon the heart musculature and evidences of nerve involvement.

Finally, give antitoxin early, give it in sufficiently large doses, and by the intravenous method.

R. N. ANDREWS.

A CRITICAL CONSIDERATION OF THE FOUR-HOUR NURSING AND FEEDING INTERVAL:

Thos. S. Southworth. (Arch. of Ped., July 1921.) The author stated that the four hour nursing interval, advocated by Czerny, had been widely adopted in the expectation that it would clear away many of the difficulties of the nursery. Within limits, it had proved helpful, but like many other dicta it was too sweeping for universal application. In a former paper attention was drawn to the longer or shorter period of adaptation which a very considerable number of new born infants and their mothers had to go through before mutually satisfactory nursing, with an attendant gain in weight was established. The four hour interval appeared to be admirably adapted for the vigorous normal infant at full term, nursing a normal mother with an abundant supply of good breast milk. However, this group as a whole thrived in former days with regular three hour intervals or two hour intervals, or indeed, in unregulated cases, where the infant asserted its own times and requirements. There have been certain

types of more exceptional cases in which the longer interval proved distinctly superior. One was where tenderness of the mother's nipples with risk of infection and mammary abscess not only made shorter intervals more hazardous but painful nursing prevented the full maternal cooperation so necessary to the normal adjustment between mother and infant. The second was that not uncommon type, the over-rich, high-fat breast milk. It seemed then that the longer interval was especially adaptable to cases that departed from the normal, to cases of maladaptation. However premature infants required more frequent feeding than those born at term. The author had seen dire results of applying this rule to them. Of full term infants there was the sluggish dormant infant whom it was difficult to stimulate to take a sufficient quantity of breast milk. There was the baby who was too weak or learned with difficulty to take the nipple especially from moderately malformed nipples and did not empty the breast; the nervous, inexperienced mother who did not know how to cooperate with the baby and defeated its efforts; there was finally the large and perhaps increasing number of mothers whose breast milk, while scanty and insufficient, was capable of being made sufficient enough to establish maternal nursing wholly or in part if stimulation was maintained with adequate frequency. Complementary feeds given at the conclusion of a nursing, to make up deficiency in breast milk, were always justifiable when the case was managed but the substitution ignorantly made of one or more bottle feedings to take the place of already too infrequent breast nursings was the most scientific way of drying up breast milk. The four hour interval was applicable to breast feeding but it did not necessarily follow that it was applicable to bottle feeding. In such cases the author recommended the shorter interval. The acceptance of a hard and fast rule was a retrograde step to our best tradition since the needs of the individual must be carefully weighed in reference to this factor of interval as well as to all other factors in infant feeding.

R. N. ANDREWS.

THE EFFECT OF COMPRESSED YEAST IN THE FOOD OF INFANTS:

Maynard Ladd. (Arch. of Ped., July 1921.) The writer states that it might be accepted as a general statement that the food for an infant must have the three known vitamins, fat soluble A, water soluble B, and antiscorbutic C, vitamins and they must be present in sufficient amounts. It is no less important to have sufficient amounts of fats, carbohydrates and protein, mineral matter and water to meet the individual requirements. Intelligent feeding presupposes that the physician has clearly in mind all these requirements when he undertakes to prescribe a substitute for the infant. It is a rare exception when a normal baby cannot be successfully reared on cows' milk properly

adapted to its individual needs. It is his opinion that conclusions reached in the feeding of rats, guinea pigs, fowls, dogs and pigs might also be applied directly to infants. Milk was not a natural food for these experimental animals except for a very limited period. Osborne and Mendel have shown that their experimental animals, failed to show normal growth when milk was added to their diet, whereas with a small amount of yeast, normal growth followed. Other men had similar experiences.

The question the writer had in mind, was to determine whether the addition of yeast, which presumably was rich in water soluble B vitamins, would favorably influence the development of infants the first year. So much has been written concerning the value of yeast that the author thought that many practitioners would be directed away from the principles of sound and scientific feeding in the hopes that a few pellets of metagen or the daily ingestion of a yeast cake would solve the problem of a deficient feeding case.

The author says that he is not trying to undervalue the brilliant work done in the laboratory but he knew from personal contact with general practitioners that many physicians were likely to neglect the common sense of infant feeding in the faith that there was a "get-fat-quick" method embodied in the use of the so-called vitamins marketed under high sounding names. In his cases he tried to determine only whether the compressed yeast added to the food which had been prepared and adapted, had any special value as a weight producer. These babies were all cases of difficult feeders. The weight charts all gave evidence of satisfactory development, but careful analysis of the rate of weight development during the period with yeast and without yeast did not show in his opinion any benefit that could be attributed to the yeast itself. As to the value of yeast in cases of acne and furunculosis, the series of cases gave no definite evidence.

R. N. ANDREWS.

A young woman wants position as laboratory technician, preferably Minnesota, either with a group of physicians or in commercial laboratory. Experience: Basal Metabolism work, bacteriological and routine clinical laboratory work. Best of references. Address XYZ, c/o Minnesota Medicine.

BOOK REVIEWS

SUBMUCOUS RESECTION OF THE NASAL SEPTUM. By W. Meddaugh Dunning, M. D. Cloth. Pp. 97, with 25 illustrations. New York: Surgery Publishing Co., 1921.

This little volume deals with the subject of submucous resection of the nasal septum in a comprehensive and practical manner. A brief consideration is given to the anatomy and physiology of the nose, as well as to the etiology and role of septal deviations.

The surgical procedure as advocated by Dunning (which is in the main the purpose of the work) varies from that of many operators in that he employs a curette to penetrate and scoop out the septal cartilage. Yet there are features to commend it. The "L" shaped incision as proposed by him is ideal. The technic is conservative, advocating removal of only that portion of the septum which produces obstruction. The method presented by the author for the removal of spurs is a good one. The etiology and prevention of "saddle-back" nose is discussed, yet this must needs be rare as the result of operative technic. The results obtained by the author in operating "asthmatics" for septal deviations are interesting, though the contention of many rhinologists is that spurs of pressure points bear no relation to asthma except when the sinuses are involved.

C. H. GORDON.

DETECTION OF POISONS. Antenreith & Warren—P. Blakiston's Son & Company. Price \$3.50.

The fifth edition of this book is a most complete treatise of the subject of the detection of poisons. Various tests for various poisons are given in great detail and are accompanied by twenty-five illustrations and numerous graphic chemical reactions.

Because of its very technical nature, however, this book will be little used or appreciated by either the practising physician or routine laboratory worker, but will be most invaluable to the chemist or toxicologist.

MARGARET WARWICK.

Wanted—A-1 location for physician in town of 500, Northern Minnesota. Write for particulars. B-26, c/o Minnesota Medicine, Minneapolis, Minn.

MINNESOTA MEDICINE

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ORIGINAL ARTICLES

DULUTH AS AN ALL-THE-YEAR-ROUND HEALTH RESORT*

Comparison with Saranac Lake, N. Y.

ARTHUR T. LAIRD, M. D.

Superintendent, Nopeming Sanatorium
Nopeming, Minn.

Physicians in Duluth are constantly asked if it is not advisable for patients with chronic throat and lung afflictions to seek a milder and presumably better climate than Duluth. There is quite a general impression among those not well informed on the subject that there are undesirable features about the climate of Duluth which would render it advisable for most invalids suffering from diseases of the respiratory tracts to take long journeys to remote parts of the country for the sake of their health.

As a matter of fact, the climate of Duluth and vicinity is in many respects very similar to that of the Adirondack Mountains, in the State of New York, known the country over as a most popular resort summer and winter for patients suffering from pulmonary and throat diseases. Saranac Lake, the home of Dr. Trudeau, the pioneer in America in the successful treatment of tuberculosis, is especially famous in this regard, and has constantly in its population a thousand or more invalids, many of whom have come from the south and west to take advantage of the climatic conditions there present. Dr. Lawrason Brown has published a little pamphlet on "Some Weather Observations in the Adirondacks" covering a period of ten years, and fortunately we have for comparison Mr. Richardson's monograph on the climate of Duluth summarizing observations extending over forty-seven years.

The similarity of the climate of the two places has long been apparent to the writer and it is interesting to have this impression confirmed by these records of detailed observations as regards latitude,

altitude, temperature, rainfall and sunshine of the two places.

Latitude: Duluth, 46° 47' N. Saranac Lake, about 44° 30'.

Altitude: Duluth lies on and at the base of a range of hills that rise rather abruptly above the level of Lake Superior, which is itself 600 feet above the sea, to a height of 600 to 800 feet. Saranac Lake is about 1,500 feet above the sea.

The average elevation of the Adirondack Mountains is 1,600 feet, with peaks 1,000 to 3,000 feet higher.

Back of Duluth is a broad plateau which immediately reaches a height of 1,300 feet or more, and there are a number of places in St. Louis County 2,000 feet or more above the sea.

The Trudeau Sanatorium near Saranac Lake is located 1,625 feet above the sea. Nopeming Sanatorium, near Duluth, is about 1,300 feet above the sea.

Temperature: The annual average mean of temperature at Saranac Lake for a period of ten years was 41.57° F.; at Duluth for a period of forty-five years it was 39° F. The average mean of temperature by months in the two places during the same period is shown in the following table:

	Jan.	Feb.	Mar.	April	May	June
Saranac Lake..	15	15	28	41	54	63
Duluth	10	13	24	38	48	58
	Jan.	Feb.	Mar.	April	May	June
Saranac Lake..	60	63	57	46	32	19
Duluth	65	64	55	45	29	17

The close parallelism is at once evident.

It has often been stated with all seriousness in regard to each of the two places that the temperature reaches 40° below zero dozens of times each winter. As a matter of fact, the official records show that the thermometer has reached 40° below in Duluth but once in forty-seven years, and 38° below in Saranac Lake but once in the ten years under consideration. It has been 30° below or more on an average of not quite once a winter in Duluth.

A temperature of 90° or more was reached nineteen times in ten years in Saranac Lake and seventy-

*Prepared at the request of the St. Louis County Sanatorium Commission.

eight times in forty-seven years in Duluth—an average of twice a year in Saranac Lake, and not quite as often in Duluth.

Rain and Snow: In Saranac Lake the average annual precipitation for ten years was 34.5 inches. In Duluth during a period of forty-seven years it was 29.2 inches.

The comparison by months is shown in the following table:

	Jan.	Feb.	Mar.	April	May	June
Saranac Lake..	2.3	2.3	2.8	2	3	3.8
Duluth	1	1	1.6	2	3.4	4.2

	Jan.	Feb.	Mar.	April	May	June
Saranac Lake..	4.1	3.5	3.2	2.7	2.6	2.4
Duluth	3.8	3.3	3.6	2.5	1.5	1.2

The winters in Duluth are apparently somewhat drier than those in Saranac Lake; while the amount of precipitation during the spring, summer and autumn months is practically the same in the two places, the variations from month to month are strikingly similar.

The porous nature of the soil in the Adirondacks enables the rainfall to be rapidly absorbed. There are only a few clay beds in that region, and little soil of a character to retain moisture. In Duluth, on account of the free drainage on the hillsides and the excellent sewer systems, there is also little retained moisture, although the character of the soil is less porous.

Sunshine: The records at Saranac Lake for possible percentage of sunshine cover too short a time to be of great value. For a few years the average percentage has been 46.2. In Duluth, during forty-seven years, it has averaged 55 per cent. The high percentage in May, in Saranac Lake, is due to a severe draught extending during the spring months of 1903. The approximate hours of possible sunshine in the two places are indicated in the following table:

	Jan.	Feb.	Mar.	April	May	June
Saranac Lake..	26	36	46	56	72	46
Duluth	50	55	50	52	55	60

	Jan.	Feb.	Mar.	April	May	June
Saranac Lake..	55	46	65	36	41	30
Duluth	65	60	20	50	45	45

The average number of cloudy, rainy or snowy days per month in each place was as follows:

	Jan.	Feb.	Mar.	April	May	June
Saranac Lake..	14	13	13	10	12	11
Duluth	10	9	10	10	11	9

	Jan.	Feb.	Mar.	April	May	June
Saranac Lake..	13	12	10	12	13	14
Duluth	6	8	9	12	13	12

From both tables it is apparent that there is more sunshine in Duluth than at Saranac Lake.

The climate of Duluth and vicinity is thus in many respects similar to that of one of the most famous summer and winter health resorts in the country. The same invigorating elements are present in both localities.

The dry, stimulating, bracing, tonic air of winter; the cool, refreshing nights of summer; sufficient moisture to insure abundant vegetation and keep the air free from dust except in the heart of the city; variety to relieve the monotony of continual sunshine; the presence of forests and beautiful scenery to delight the eye and refresh the mind—all of these elements are decided assets in a health resort where tuberculosis is treated.

As a matter of fact, no climate is characterized by favorable weather conditions all the day and all the year. No climate is entirely good. To live in a highly favorable climate all the time, a person would have to divide his year between different localities, living in one locality at one season and in other localities during other parts of the year.

More important for the patient than the elusive ideal climate are suitable food, abundance of rest and peace of mind, adequate medical care and supervision. While it is undoubtedly true that certain types of chronic bronchitis would be benefited by life in a milder climate than that of Duluth, conditions in this region are suitable and satisfactory for most patients in earlier stages of tuberculosis. Many patients have recovered their health in Saranac Lake and not a few in St. Louis County.

The question of the relation of climate to recovery from tuberculosis is discussed in an article by Assistant Surgeon General Frank of the United States Public Health Service, published as a bulletin for the information of patients. In it we find this significant statement, "No climate can make up for insufficient food, nor for the necessity for working when one should be resting, and least of all make up for the devitalizing effect of homesickness or excessive worry."

Intelligent guidance is the most important factor in the treatment of tuberculosis, and that is one of the factors in the success of the treatment of tuberculosis at Saranac Lake.

Compared with other parts of the country, Duluth has a most excellent climate, and one which may justly be considered one of the greatest assets to this region.

EXPERIMENTS DEVELOPING TECHNIQUE FOR THE STUDY OF THE CHEMISTRY OF NUTRITION AND GROWTH*

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Chemistry, although claimed to be a pure science, has always been intimately connected with arts, industries, and professions. The origin of chemistry is unknown, but facetious legend tells us that the angels, influenced by women's desires, taught them the divine secrets of chemistry which enabled them to dye their dresses and color their eyebrows.

Chemistry has, during authentic history, been dependent on medicine to a considerable extent. The words alchemy and elixir come from two synonymous Arabic words meaning a catalytic agent capable of transforming baser metals into gold. We now know that metals may transform themselves into other metals, but no catalytic agent has been found to hasten this process, and the transformation is from the rarer metal, radium, into baser metals such as lead.

The great elixir or philosopher's stone was said to be so potent that it could transform a million times its weight of metal into gold, and to cure all diseases and if taken once a month to prolong life indefinitely. Modern ideas of enzymes are quite similar to those of the philosopher's stone. The philosopher's stone was dissolved in a good white wine and the draught taken after midnight. We now have an elixir of enzymes, which is pepsin dissolved in 15 per cent alcohol, to be taken whenever you like. We do not know the chemistry of enzymes and we know the action of enzymes only in certain cases. To say that all chemical processes in the living cells are explained by enzyme action is an evidence of credulity similar to that of the alchemists.

Attempts have been made to show that vitamins are enzymes, but have failed. We do not know the chemistry of vitamins, and in their identification the chemist is dependent on

medicine. The absence of the vitamine is indicated by inanition or sickness in an animal or patient and the presence of the vitamine is indicated by the cure of the disorder. Thus we see that the history of chemical therapeutics repeats itself; we first had the age of the philosopher's stone, later the age of enzymes and now the age of vitamins. Nowadays we associate the idea of the philosopher's stone with fraud, whereas it was the first theory of catalytic processes. Vitamins are similar in theory to the philosopher's stone, since very small quantities are sufficient to produce large changes. Let us hope that the idea of vitamins will be kept free from association with fraud.

It has been known for a long time that diet has an influence on health. The experiments of Lind in 1743 showed clearly that the simple addition of orange or lemon juice to the diet of sailors suffering from scurvy cured them in six days, whereas pure acids had no such effect. Perhaps the most striking experiment was that of Baron Takaki, Inspector General of the Japanese Navy. A disease called beri-beri had been in Japan for a thousand years and had caused a high morbidity rate in the navy. By a simple change of the diet from a preponderating rice diet to a diet similar to that of the navies of the great powers the disease was practically eliminated. It was shown by Eijkmann, who was medical officer in a Dutch prison in Java, that the diet of the prisoners with beri-beri caused neuritis in chickens fed from the table waste. He further showed that these chickens could be cured by an extract of rice bran, and that the prisoners could be cured in the same manner. Shortly afterward Holst and Frohlich showed that scurvy could be produced in the guinea-pig. From this time on numerous experiments have been made in the study of human nutritional diseases by imitating the conditions in animals. Hopkins in England and Osborne and Mendel and Macollum in this country have shown that a substance occurring in butter, cod liver oil and green leaves is necessary for the growth of young animals, and without this substance these animals not only stop growing, but develop ophthalmia. It is now customary to name these hypothetical substances curing ophthalmia, beri-beri and scurvy in the nomenclature of

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Funk as the three vitamins A, B, and C. Vitamine A occurs in butter and green leaves, and to a less extent in roots and seeds, but according to Zilva it may be 250 times as concentrated in cod liver oil as it is in butter. Other animal foods are more variable in their content of this vitamin. An animal stores this vitamin in its body when it has a superabundance of it in the diet, and it can grow on a diet free from it until this store is exhausted. A newly weaned rat may have a store of vitamin A sufficient to last three weeks, but a rat weighing 200 grams may have a store sufficient to last three months.

Vitamine B occurs in leaves, seeds and yeast, and to a less extent in roots and in various animal products. It is necessary for growth and is not stored in the body. When the young are fed on a diet lacking it, they fail to grow from the start. After about three weeks starvation in respect to this vitamin paralysis appears and Walerian degeneration affects some of the nerve fibres.

Vitamine C is not necessary for all animals. Guinea-pigs, monkeys and man have the highest demand for it. Rats can live and breed on an amount of this vitamin that cannot be detected in guinea-pig experiments. It is doubtful that the animal body synthesizes any vitamins. The ultimate source seems to be the plants. The liver seems to store vitamins A and C. It contains vitamin B but perhaps not more than is necessary for its own activity.

It was shown by Watson and Fordyce that a diet of lean meat causes changes in the bones of rats such as are described in rickets. Bland Sutton showed that rickets occurred in animal whelps in the Zoological Garden in London if fed on lean meat, and that fat meat cured them of this disease. Mellenby showed that certain diets caused rickets in pups and that rickets was prevented by sufficient quantities of butter-fat and he therefore supposed that vitamin A prevents and cures rickets. He also obtained cures with substances poor in vitamin A but rich in phosphoric acid. Sherman and Pappenheimer produced rickets in rats by total absence of Vitamin A and a deficiency of phosphoric acid. McCollum and Park obtained rickets in rats on diets poor in vitamin A and in phosphoric acid. Some of the diets were said to be slightly deficient in calcium. How-

land found the phosphoric acid content of infants' blood very low in rickets. The simplest hypothesis might be that rickets is due to lowered concentration of phosphoric acid in osteoid tissue. Calcium phosphate is precipitated when the product of the concentrations of calcium and phosphoric acid exceed a certain value. If either the calcium or the phosphoric acid is reduced, failure to precipitate will occur. The lowering of the calcium of the diet causes profound changes not only in the bones but also in the nervous system, and the absence of calcium in the diet is so injurious as to prevent prolonged experimentation. The typical picture of rickets seems to be produced by deficiency of phosphoric acid. It was shown by Dr. Robb in my laboratory that vitamin C causes a loss of calcium from the body. Since Howland has shown low blood phosphoric acid in rickets, and vitamin A seems intimately related with the factors preventing rickets, it seems probable that vitamin A has to do with the phosphoric acid retention just as vitamin C has to do with calcium retention. In both rickets and scurvy the bone calcium phosphate is reduced. Apparently in scurvy it is due to loss of calcium from the body and in rickets primarily to the loss of phosphoric acid.

EXPERIMENTAL

Our first experiment is to determine whether the effect of different diets on the bones of white rats could be determined by means of the *x*-ray. Rats of about the same age and 30 grams in weight were placed on the following diets: (1) raw lean beef, (2) cooked lean beef, (3) oats with one gram of raw lean beef a day, (4) oats with one gram of cooked lean beef a day, (5) oats and corn meal, (6) oats and soy beans, (7) spinach, wheat flour and milk powder. (Spinach may be substituted by Swiss chard or alfalfa with similar results.) At the end of three months these rats were *x*-rayed. The accompanying Figure 1 shows rats on diets numbers 6 and 7. It will be noted that the bones in number 7, which is the only adequate diet of the series, are heavier, that is, cast deeper shadows than the bones in number 6, which is typical of the rest of the series. The difference is generalized and no resemblance to human rickets is observed. Hess and Sherman have obtained typical pictures of rickets from the *x*-rays of rats. In the



Fig. 1. Radiographs of two rats in Experiment 1. Rat 7 is on the left and Rat 6 on the right.

above rats, calcium determinations were made on the bones, the tibia from one animal on each diet being used. There were no marked differences in the percentage calcium contents of the bones of these animals.

In the second experiment, seven rats of the same litter were fed a basic diet of equal parts of soy bean flour, oat meal, rye flour, cornmeal and four times this amount of wheat flour, and in addition different quantities of milk powder, 2 per cent, 4 per cent, 7 per cent, 10 per cent, 20 per cent, 30 per cent, and 60 per cent. The rat without milk powder died, and in Figure 2 is shown another rat about the same size as this was at death. These rats grew in proportion to the percentage of milk in the diet. After a while, however, all of those with the higher percentage of milk grew up to normal rate and it was only the lowest percentages of the milk that showed a difference in growth. In this experiment not all of the cereal was the whole

cereal; some of it was degerminated and it was decided to use whole grain in another experiment.

In this third experiment oats were fed ad libitum and an accurately measured amount of reconstituted milk powder a day was given each rat. The milk powder was mixed with water to form a 12.5 per cent solution and measured in cubic centimeters and fed to another series of rats of the same litter as follows: 4, 6, 8, 10, 12 and 14 c.c. Two other of this same litter were fed buttermilk; one 10 c.c., and the other 20 c.c. These experiments were carried over a period of four months. All these rats had growth curves below normal, which were more marked in those receiving less milk. Calcium determinations on the bones of these animals showed practically no difference, but all had a diminished calcium content.

In the fourth experiment ten rats of the same litter and 30 grams in weight were fed



Fig. 2. Rats in Experiment 2 receiving 0, 4 and 30% milk powder.

on a basic diet of 10 per cent pure casein, 6 per cent sea salt and 84 per cent wheat flour. Control experiments showed that this mixture was adequate in protein in the total calories and in inorganic salts.* It had perhaps half the required quantity of vitamine B but no vitamine A. To this basic diet was added in different percentages in the diets of the different rats as follows: 0, 1, 2, 3, 4, 5, 6, 7, 8 and 9 per cent powdered spinach at the basic diet. At first these rats grew in proportion to the spinach in the diet up to 5 per cent spinach, but those on 6 to 9 per cent spinach did not grow faster than the one on 5 per cent. After they had attained 100 grams in weight, the ones on 1 and 5 per cent spinach grew no faster than the one on three per cent spinach. The one with 0 per cent spinach developed ophthalmia and died. In another experiment we showed that one-tenth of 1 per cent spinach was sufficient to delay ophthalmia and death for ten days. With no vitamine A these young rats usually live only about a month, and yet the small amount of vitamine A in one part in a thousand of spinach is sufficient to tide them over another ten days or so, and the delay in ophthalmia is greater than the delay of death, the animals dying without a very advanced development of ophthalmia. In these experi-

ments pure chemical substances were not fed. The composition of the diet is fairly well known. Cereal diet is deficient in amino-acids, mineral salts and vitamine A. In the case of degerminated cereal, white flour has about half enough vitamine B and no vitamine A. Meat is deficient except in amino-acids. Milk, then, and spinach would supply deficiencies in amino-acids, mineral salts and vitamins where such deficiencies existed. If the vegetable proteins are mixed from a number of different sources, the deficiencies may be supplied. Therefore, in a mixed cereal diet the protein deficiency is not so great as in using one cereal. Soy beans supply adequate protein. In regard to phosphoric acid, it is contained in the mineral matter of many foods and also in certain proteins and lipoids. In case casein is fed, the diet has sufficient phosphoric acid.¹ The sea salts have a very small amount of phosphoric acid and that deficiency could be made up if casein was used in the diet. There is a considerable amount of literature on the effect of phosphorus in rickets, but this seems to be based on a misunderstanding. Phosphorus does not occur in the bones or in the body anywhere. Phosphoric acid, not phosphorus, is the substance which is deposited with calcium in the bones forming calcium phosphate. In case phosphorus is added to cod liver oil the amount is very small, owing to its high toxicity. This phosphorus might be oxidized in the body to phosphoric acid, but the amount would be very small, and therefore of very little therapeutic value. Perhaps it is the attempt to oxidize the

*Further observations showed that all the rats in Experiment 4 had mild rickets. Thirty % casein or 40% spinach furnishes enough phosphoric acid to prevent rickets. The demand for phosphoric acid decreases with growth and healing may occur without change of diet.

phosphorus that kills the patient. Phosphorus poisons the liver, possibly due to its reducing action.

In Experiment 5, eight rats were placed on a diet of pure casein 12 per cent, white flour 60 per cent, pure cane sugar 20 per cent, dried yeast 3 per cent, sodium chloride 2.5 per cent and calcium oxide 2.5 per cent. They also received cod liver oil 0, 2, 3, 4, 5, 6, 7 and 8 drops per week. The technique of feeding these animals was not perfected, as shown by later experiments in which cod liver oil had a marked effect on increase in growth rate. The experiment extended over four and one-half months. Calcium determinations on the tibia of these animals showed a diminished amount of calcium in the bones, being most marked in those that received only small amounts of cod liver oil. Growth curves were all below normal. This is not due to the fact that 8 drops of active samples of cod liver oil a week is insufficient, however, as shown by later experiments.

Experiment 6. In this experiment a litter of six rats were placed all in the same cage and received the same diet, which was 70 per cent white flour, 20 per cent sugar, 3 per cent dried yeast, 2 per cent milk powder, 2.5 per cent sodium chloride and 2.5 per cent calcium oxide. The experiment lasted four months. Growth curves of all these rats were below normal. At the termination of this experiment the animals were divided into two groups and were given a calcium-free diet for five days. After they had been on this diet for two days their urine and

feces were collected over a three day period. The calcium-free diet consisted of hydrogenated fat, sugar, calcium-free filter paper and sodium chloride. In addition the second group of rats received calcium-free butter-fat. The calcium output in the excreta in group 1 of three rats was 11 milligrams, in group 2 of three rats was 10 milligrams. This may have indicated a slightly greater retention of calcium in the bones of the rats receiving butter-fat, which contains vitamin A. These calcium determinations were done by Lyman's method. Better methods have been developed by one of us and these experiments are being continued in regard to phosphoric acid as well as calcium and on diets that produce rickets in rats.

Experiment 7 was made to determine the antiscorbutic action of concentrated orange juice, which was evaporated down to such an extent that it was not attacked by a mold and apparently would keep for a long period. During the evaporation the temperature did not rise above 135° F. The orange juice was reduced to one-sixth of its original volume. Thirteen young guinea-pigs were used, about 160 grams in weight. The basic diet was equal parts by weight of the alfalfa meal and white flour. Ten of these animals also received daily measured amounts of reconstituted orange juice from the above concentrated preparation. Three guinea-pigs received no orange juice. About 1.5 c.c. of fresh orange juice daily will prevent scurvy in guinea-pigs for a long period and although there may be some variation in



Fig. 3. Guinea pigs in Experiments 7 and 8 drinking reconstituted dried orange juice from a pipette.

oranges this figure is taken in comparison with the reconstituted orange juice. The reconstituted juice made up to the concentration in the fresh orange, that is, about 12.5 per cent of total solids, was fed in the amounts: 0.3, 0.6, 0.9, 1.2, 1.5, 1.8, 2.1, 2.4, 2.7, and 3 c.c. per day, per guinea-pig (fed as in Figure 3). The guinea-pigs receiving no orange juice died of scurvy in 3 weeks. The three receiving the least amount of orange juice developed typical scurvy in about 20 days and lost weight. The other guinea-pigs receiving a large amount of orange juice did not develop scurvy but gained steadily in weight up to the time the experiment was completed and were in a perfectly healthy condition. Their growth curves are shown in Figure 4. In this figure those receiving no orange juice are represented by a single curve number 0. It will be seen in Figure 4 that the growth is proportional more or less to the amount of orange juice. Calcium determinations were made on the teeth but these determinations will be repeated later. Similar results were obtained by McClendon and Shillington on powdered orange juice.

Experiment 8. In this experiment the concentrated orange juice was diluted with a volume of distilled water and then treated with Fuller's earth containing enough calcium carbonate to precipitate the citric acid, filtered with the suction filter and the calcium was precipitated by adding potassium oxalate a few drops at a time and then centrifuging and repeating until no further precipitate remained. Toluol was added as a preservative. This product was fed by means of a pipette as shown in Figure 3, to the extent of 4 c.c. a day to three guinea-pigs that had severe scurvy and were below their original weight. On this treatment they ceased to lose and steadily gained in weight up to the time of closing the experiment. Another guinea-pig that had scurvy and had been cured was placed on a scorbutic diet for one week and was then fed by a pipette 0.75 c.c. of the above product daily for a period of nineteen days and gained in weight. At the end of twenty-six days the experiment closed and the animal was in active state with no signs of scurvy, showing that the anti-scorbutic vitamine had survived this treatment.

In our metabolism experiments with animals we find it saves very much time to have the

diet in dry form. Any quantity of this diet and a single analysis made will suffice for the whole period of feeding. Whereas, if fresh may be prepared and mixed until it is uniform milk was used for feeding an analysis would have to be made each day and if ordinary mixed diets were used analyses would have to be made each meal. In our experiments we make enough of the dried food to last for the whole series of experiments and make one analysis in duplicate. The animals are placed in a metabolism cage with wire screen bottom which sits in a large silica dish, and supplied with distilled water. About enough food for one metabolism period, three days or more, is weighed out carefully and placed in a separate container. If this is a bird-feed receptacle it is attached to the cage. Otherwise only part of the food is transferred to a container and placed in the cage, at one time. In case a tableting machine is at hand the food may be made into tablets which will not fall through the wire screen. In case the food does not suffice, more can easily be weighed out, but all that is weighed out is finally placed in the cage. At the end of the metabolism period all of the food or other matter in the cage, except the animal itself, is shaken down into the silica dish. The mixed excreta and waste food are ashed in this same dish and analyzed. A metabolism balance is gotten by the difference between a certain constituent in the total feed and the mixed waste matter. If there is less in the food than in the combined waste the animal has lost some of that constituent from its body, whereas, if there is more in the food than in the combined waste, the animal has stored up some of that constituent in the body.

It seems desirable to run metabolism experiments on infants in the same manner. The less the number of analyses the greater the accuracy, and therefore if we can prepare a dry diet to be weighed out carefully in the beginning and portions mixed with distilled water at intervals and any portions not consumed by the infant added to the excreta, greater accuracy in the metabolism balance will be obtained. The only difficulty that seems to exist in regard to such experiments is the overcoming of the objections of physicians and mothers to dry diets. The public has been exploited by patent baby

foods and is very suspicious of any dry food. It has been shown, however, in England and also in this country (in Boston) that milk powder is preferable from some standpoints for infant feeding to fresh or pasteurized cow's milk. If mother's milk cannot be obtained, less digestive disturbance may be expected on milk powder than on fresh milk. Whether the superiority of milk powder exists in any individual case or not need not concern us, but if a dry diet can be shown to be equally adequate as compared with a fresh diet it could be used successfully in metabolism experiments. The majority of milk powders are very poor in vitamin C and may give rise to scurvy if not supplemented by anti-scorbutic, but pasteurized milk itself may be deficient in anti-scorbutic and it is always safe to give additional anti-scorbutic. It has been stated that the loss of anti-scorbutic in condensed milk is due to the sterilization after it has been canned, and sweetened condensed milk that contains enough sugar to avoid the necessity of sterilization may contain some anti-scorbutic. Drum-process dry milk is said to contain more anti-scorbutic than spray-process dry milk. However, unless the determination of anti-scorbutic has been made on a particular product it is safer to add more in the form of orange juice or some other food to the diet.

I have tried several dried food preparations on my own infant when two weeks to eight months old with gratifying results, and although this one experiment with no control except another infant born previously and breast-fed may not seem conclusive, I can see no objections to the use of dry diets. The infant that was fed on about half dry diet and half breast milk seems perhaps better nourished than the one on entire breast feeding up to eight months.

The first preparation was 2,000 grams of whole milk powder, 1,250 grams of cream powder, 2,600 grams of lactose, 300 grams of powdered lemon juice, 0.25 grams of sodium iodide and 5 grams of ferric sulphate. This mixture was added to water to make a 12.5 per cent solution and then contained about the average percentage of protein, fat and lactose found in human milk, and in addition a little iron and iodide. When this powder is mixed with water, the lemon juice brings it to about the iso-electric point of the casein ($\text{PH}=4.5$) so the casein

does not dissolve but remains suspended, that is, in a curdled condition. It appears from the studies of Marriott that this may be an advantage. Marriott has shown that cow's milk has a higher buffer value than human milk; that is to say, it requires three times the amount of acid to bring it to $\text{PH}=5$, and therefore it would require three times the amount of gastric juice to cause maximum clotting by rennin. The clotting by acid alone is at a very slightly greater acidity ($\text{PH}=4.5$) but may be different from the clotting by rennin. It is stated that in clotting by rennin the protein is split into two parts. However, if the milk is already clotted by acid before being drunk, the additional acid in the stomach may transform the casein into acid-albuminate, and, according to Brailsford Robertson, a splitting of the protein molecule occurs in this process.

The second milk powder was of practically the same formula, with the exception that orange juice powder was substituted for the lemon juice. The acidity was so high that curdling of the milk occurred here also.

The third mixture was skimmed milk powder to which was added 3 per cent powdered orange juice and 3 per cent powdered spinach. Owing to the removal of the fats the calorific value

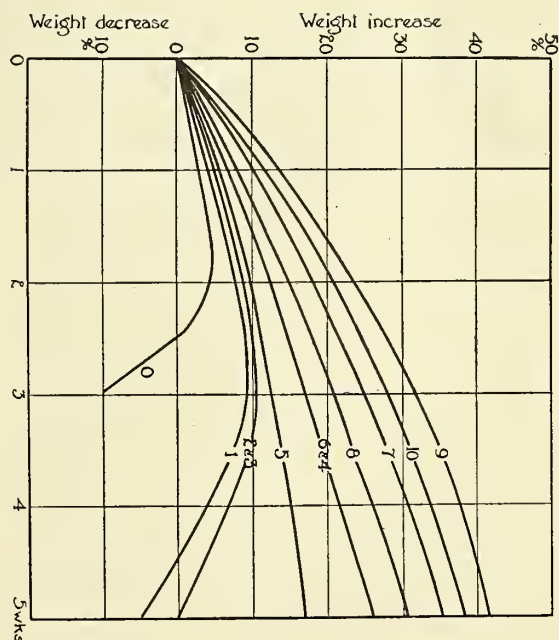


Fig. 4. Growth curves of guinea pigs, 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, fed respectively 0, 0.3, 0.6, 0.9, 1.2, 1.5, 1.8, 2.1, 2.4, 2.7, 3 c.c. of reconstituted orange juice per day.

was reduced so that the concentration should be greater than 12.5 per cent. In fact, one ounce of this powder was dissolved with 5 ounces of water to make the calorific value about equal to that of the average human milk. This mixture is practically fat-free and is high in protein. The vitamine A which is taken out by the removal of the fat is restored by the addition of powdered spinach. Owing to its high casein content and also due to the spinach it is very high in phosphoric acid. The orange juice supplies the vitamine C. This mixture contains more vitamine B than is contained in cow's milk because vitamine B is more concentrated than in the ordinary cow's milk owing to lower water content, and vitamine B is contained in the spinach and the orange juice. It was made fat-free at the suggestion of Doctor Sedgwick for use in case any tolerance for fats was shown by the infant.

We do not exactly understand the chemistry of the fat intolerance. Calcium soap if present in abnormally high percentage in the stools does not indicate any failure of the fat splitting enzyme because such a condition can be produced by a biliary fistula. In fact, calcium soap cannot be formed until free fatty acid is split off. Calcium soap indicates a failure to absorb the fatty acid. Fatty acids are not soluble to any appreciable extent, but are soluble in bile and are absorbed with the bile. This bile that is absorbed with the fatty acids passes through the blood to the liver again and is secreted. The rate of this circulation of the bile varies, however, may be very slow in constipation and more rapid in normal conditions, or sometimes, in diarrhea. Perhaps the cause of the fat in the stools is deficiency in bile and this

deficiency may have the same cause as the constipation. In many deficiency diseases we have a deficiency of digestive secretions and food deficiency may be the real cause of the trouble.

In experiments with these dry diets it is always remembered that breast feeding is the preferable form of infant feeding* and it is not intended to use them as a substitute; but if artificial feeding is necessary, it is of enormous advantage for the study of the chemistry of nutrition to have dry diets. Many changes go on in wet diets, not only due to bacteria but due to decomposition of the more perishable contents by hydrolysis and oxidation. Vitamines and fats may be oxidized and carbohydrates and other substances hydrolyzed and proteins may change their colloidal condition. On dry diets, however, about the only change that has been detected is the oxidation of the fats and that can be prevented by the exclusion of air.

It should be remembered that water is an important constituent of the diet. Marriott claims that dehydration of the body may cause fever. I have observed no ill effect following use of the fat-free diet of lowered water content. The infant should be weighed daily and any loss of weight or failure to make a normal gain should lead to an investigation.

*Provided it is not deficient in any necessary constituent. Bosworth claims that the high calcium content of cows' milk hastens clotting of the milk and that complete clotting is harmful. We do not know the function of clotting. If infants can absorb immune bodies from colostrum they may absorb some unaltered protein, and clotting of the colostrum or early milk might be a safeguard against anaphylaxis. Perhaps the presence of large curds in the stools is the result and not the cause of diarrhea.

ENDOCRINES AND SYMPATHETIC*

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To attempt a paper on endocrinology at a time when the general feeling is so decidedly against it, may seem too daring; yet, after agreeing with the medical profession that its commercial side is a perfect disgrace and that the results thus far obtained through scientific research are rather disheartening, there still remain some very impressive facts.

There are undeniably endocrine diseases as well as endocrine monstrosities; and there are, besides, reliable reports of good effects brought about by endocrine medication.

Criticism, as long as kept within the boundaries of serene, scientific discussion, is most welcome; the *Journal of Endocrinology* is the best example of it; but when the criticism is carried to the extreme of an almost gratuitous slander, it must be called to order, unless we want to see the normal growth of a promising science fatally endangered.

Most criticism is due to our onesidedness, in that only one theory at a time is accepted to the exclusion of the others. This seems to me to be a sad mistake, because a new theory cannot ignore well established facts. As a result the more we progress the wider our theories necessarily become. Through the experience of the past they grow more and more comprehensive and succeed in embracing into larger and better constructed systems many previously narrower ones.

Endocrinology does not try to supplant any other branch of medicine. If anything, it tries to explain physiological and pathological problems, thus far wholly unexplainable. I am confident, that the few established facts that we know of this new science, will, when logically put in their true light, suffice to prove it.

The harmonious interrelation of the endocrine glands and their connection with all the activities of the organism implies also the necessity of a joint discussion of the vegetative nervous system. The endocrine phenomena for the most part expressed through the sympathetic, have their foundation in the nature of chemical action, while the sympathetic nervous system explains, through nerve in-

terrelation, the effect of this primary chemical action upon other organs.

Endocrinology, while perhaps claiming too much, is, by general consent, only allowed a few freaks in the field of pathology; therefore, in regard to these few abnormalities at least, we can consider ourselves on endocrine ground. Let us glance at some of these conditions and see what conclusions can logically be drawn.

First, in order of time, the removal of the thyroid brought us to the understanding of myxedema, which gradually led us to explain cretinism through hypofunction of the thyroid.

On the other hand Graves' disease showed us some aspects of thyroid hyperfunction, which appears in a pure form in the hyperfunctioning adenomatous goiter.

In regard to the pituitary apparatus, acromegaly—in its beginning at least,—gives a full demonstration of hyperfunction of the gland, while Froelich's syndrome is the result of degeneration or hindered action of the pituitary.

The condition brought forth by castration is very well known and there are reliable reports of sexual precocity and exaggerated genital function accompanied by tumors of the testis and of the ovary.

Adenoma of the adrenal cortex is seen to cause, even before puberty, in the male an exaggeration of sexual characteristics, primary as well as secondary, while in the female adiposis is found and a few masculine secondary characteristics.

Addison's disease, which affects the adrenal cortex, either directly or through the sympathetic, creates a condition of general weakness and decay of the organism.

It is rather difficult to find these abnormalities in a pure form, because, owing to the glandular interrelation, the function of the correlated glands naturally comes into play, to complicate the initial picture of these diseased conditions. In spite of this there are enough elements in all of them to demonstrate how the organic effects of hyperfunction or hypofunction are opposed to one another.

Let us take for instance the thyroid gland, which is the best known. The total removal of the gland causes diffuse myxedematous infiltration, dry, cold, thick, yellowish skin, flaccid muscles, decaying teeth, atrophic frail bones, genital impairment, cold sensation, slow pulse and slow metabolism and a severe torpor in all the mental reactions.

*Presented before the Ramsey County Medical Society, St. Paul, Sept. 26, 1921.

Should the thyroid fail in the period of growth, the further skeletal development is prevented, especially the growth in height, the teeth stop growing and so do the skull and the face, while the genital and mental development is brought to a stop.

The opposite picture occurs in case of hyperfunction of the gland. We can logically surmise the existence of intermediate conditions between the two extremes; and actually we are often confronted with people, who, without being true cases of myxedema, offer some signs of the syndrome in a less defined form, slight, sometimes hardly noticeable, yet clear enough to lead us to find the reason in a hypofunction of the thyroid. More than that, a thyroid medication, prudently administered, returns these people to normal.

An analogous, partial, attenuated syndrome in the field of hyperthyroidism is found many a time; and, if we want to go still further, there are a number of cases which offer conditions of hypo- and hyperfunction at the same time, mixed form, which has been called "unstable thyroidism."

All these belong on a more or less pathologic ground; but, even among healthy people, we find some who show neither syndrome, and yet, on account of their bright eyes, thin, somewhat moist skin, quick mental reaction, slender body and so forth, remind us of a hyperfunctioning thyroid; while, in the opposite field, when there is rather dry skin and hair, somewhat slow pulse, slow mental reaction, decided sensibility to cold and so forth, we are brought to think of thyroid hypofunction. These people are not pathological; perhaps they never will have any accentuated thyroid abnormality; they only form two different types, which in health and in sickness will react in a peculiar way of their own; in short they represent two different "constitutions."

Analogous results will be found in the pituitary field as well as in the field of the gonads, of the adrenal system and so on.

At the first impression this offering back to the medical world the old humoral pathology with its different types, called constitutions, may look rather discouraging; but on further consideration the constitutions, as shown through endocrine light, are so well defined, that they cannot fail to give us a better understanding of the patient and of the way of treating him.

What has been said so far regards pure forms of endocrine disturbances, such as are very seldom

found. Owing to the harmonious interrelation of the several glands, the abnormal functioning of any of them will necessarily allow abnormal functioning of others and consequently offer a more and more complex symptomatology.

A hyperfunction of the pituitary will cause in process of time hypofunction of the gonads (which, by the way, may be preceded by a short period of hyperfunction). This is followed by a hypertrophy of the adrenal cortex and may bring forth exaggeration or even inversion of the secondary sexual characteristics. With late castration signs of hypofunction of the pituitary and hypertrophy of the adrenal cortex appear and signs of thyroidian dysfunction may be detected in either form. Furthermore, it is known that whenever there is a marked insufficiency of either thyroid or pituitary, puberty is either partially or totally prevented, according to the degree of deficient function in these glands.

The most striking instance of interrelation is offered by the adrenal cortex, which appears earlier than the gonads in embryonal life, and whose size is relatively greater at the time of prenatal sexual differentiation, than after birth. Furthermore, pseudo-hermaphroditism is hardly ever seen without abnormality of both adrenal cortexes. In life its size is apt to increase during breeding season in animals, in pregnancy and after castration; it is found increased in acromegaly, and its development is very poor whenever there is a persistent thymus. In its hyperfunction, as brought forth by an adenomatous condition, it seems to favor, in the male, an exaggerated development of sexual characteristics, primary as well as secondary, and in the female, whose sexual organs are less differentiated than the male's from the primary indifferent form, the primary sexual characteristics are checked, while male secondary characteristics and adiposis appear. When, furthermore, we consider that the cortex elements are very similar, if not identical, with the interstitial tissue of the sexual glands, that they both come from the same neighborhood in the mesoderm, and that the cortex is generally smaller in the female than in the male, we are led to think that this gland may form the link between the body and the genital apparatus. This point, though, being only hypothetical, we shall not discuss.

The frequent finding of hypertrophy in a gland, when another is deficient or absent, as happens between pituitary and thyroid, between thyroid and

parathyroid, etc., suggests the possibility of a compensatory hyperthrophy, or, in other words, that the hypertrophied glands perform the work of the deficient ones.

In reality there is not always a true hyperthrophy; the enlarged thyroid, for instance, often found in acromegaly, is due to increased connective tissue and produces, if anything, myxedematous symptoms. In case of a real hypertrophy, it does not seem to supply the function of the deficient gland. A hypertrophied pituitary with deficient thyroid gives short, thick bones, i. e., pituitary bones, while the hypertrophied thyroid with deficient pituitary gives long, slender bones, i. e., thyroid bones; so that the desired substitution is missed in both cases. More than that, the thyroid acts mostly on epithelial elements, while the pituitary influences the mesoderm in all its manifestations, with a partial exception in regard to the muscular tissue and the genital apparatus, which seem to depend also upon the action of the adrenal cortex. This being true the interrelation is clear, but not the substitution; as, whenever a gland fails, its correlated ones are only allowed a full swing, each strictly in its own field.

The difference in the nature of gland function should also make us discard the thought of any inhibition (a word, by the way, that has more a social, than a natural meaning); as, while all together with a perfect balance work to form a harmonious organism with harmonious functioning, in the dysfunction of some of the glands the work of part of them may become exaggerated, the work of others may be reduced but there is never a cessation of function in any, unless the gland is fully atrophied or has been removed.

The endocrine chemical interrelation might give us the explanation of "homostimulation." The balance in endocrine action must be due to the catabolic principles of the glands brought to one another through circulation. Should one of them fail, the catabolism becomes altered for the other glands, first, and reflexly for the abnormal one. By giving a corresponding normal foreign extract the catabolism would be set right only for the other normal correlated glands first, and through them for the particular abnormal gland, giving it in this way a good help towards recovery.

An instance of apparent failure in this kind of stimulation is found in the spring pregnancy of hogs. Their thyroid is known to undergo some changes during the winter (poverty of iodine and

perhaps other abnormalities which we do not know), and thyroid medication absolutely fails to stimulate the gland. In this condition iodine obtains the desired effect on the general metabolism, yet without inducing any change in the thyroid of the animal. In this case, though, we are dealing with a differently constituted winter gland, on which no effect can be expected from a stimulation, only fit for the usual thyroid.

The good effect of thyroid medication in post-operative myxedema is due, first, to the still satisfactory condition of the other glands; and, second, to the fact, that, on account of the colloid, the medication offered is not a stimulation, but a substitution. The cretin, whose other glands are anything but normal, may show a striking improvement at the beginning of the treatment, only to come to a standstill later on. This is so true, that many a time no improvement can be even started, unless a pluriglandular treatment is given.

Thus far the endocrine system has been shown only in regard to the constitutional changes induced in the organism, while nothing has been said of the nerve interrelation. Let us try to see the behavior of the endocrines in the changes brought forth by the external and internal influence, acting through the nervous system.

To throw some light on the subject it is indispensable to know what is meant by a nervous action, and then to study its play in connection with the aforesaid influence.

Let us start with the "gastrula," in which the interrelation between the layers will be accomplished by chemical action, as it is generally agreed in regard to indifferentiated organisms.

When this primordial formation begins to grow differentially into the several ectodermic and endodermic organs, the relation of continuity between the layers becomes interrupted by the independent growth of the external and the internal layers in respect to each other. The mesoderm will take care of it, as also of the tissue of support within the organs, thus severing their components from one another, with the result of rendering apparently nil the direct chemical action, as understood in the simple, primitive cell.

Owing to this change the chemical action, if it has to work at all, must in its turn follow the differentiated growth of the organism and become concentrated and specialized. Such would be the origin of the endocrine glands. In this connection the function of interrelation is taken up by a

new element, the nervous system. At this moment begins the wonderful task of an apparatus, which will respond, from now on, to every new organic need with a new corresponding association.

Embryonally there is only one nerve apparatus, but functionally speaking we can actually think of three different systems. First, of course is the cerebro-spinal system, to put us in connection through action and reaction with the external world. This, however, cannot by itself provide food. Second, the slow visceral system (due to emigration of cells from the first), which shows a decided autonomy of action, and finally the sympathetic system, which forms a link between the two others.

The famous experiments of Goltz and Ewald would imply that the functioning of the visceral system is wholly accomplished by the sympathetic; yet, when we remember that the excitors of the sympathetic come all from the cord and the afferent branches all go back to it, I cannot see how a sympathetic, severed from its centers, may still retain any valuable power of control over any apparatus. At the most we might suppose that, through the isolated sympathetic, correlation is preserved between the various viscera, otherwise autonomic.

The striking difference in the function of our organs, some specialized for the vegetative life (anabolic) and others for the animal life (catabolic) has led us to surmise the necessity of a new special function—the trophism—and of the consequent existence of trophic nerves, as nerves are the only link to be found between anabolic and catabolic organs. The disagreement still existing in this field may justify a few considerations on the subject.

Our having a time for eating and another for working has made us feel, that these are two widely independent functions. In spite of this belief we all know that a muscle kept too long at rest loses much of its size and power. We know that in cerebral hemiplegia there is some loss of muscular tissue, yet not a complete one thanks to the "tonus" still preserved in the paralyzed muscle, while spinal destruction is followed by flaccid paralysis with gradual, total loss of contractile tissue. It is common knowledge that a well understood training of the body as well as of the mind brings forth a well balanced development.

On the other hand we know that functioning of any organ or part of it is accompanied by an increased flux of blood. That the function of the blood in the nutrition of the cells is an established

fact; so that it does not seem so unreasonable to surmise that the nutrition of the cell is determined by its functioning.

I insist on this point, because, once we rule out the function of trophism (as a function *per se*) it will be easier to understand the significance of the nerves. There is not a single activity of the body that is not performed either by a gland or by a muscle; the nervous system, though in connection with all the muscles and all the glands, does not create any function, but through its faculty of feeling the impulses and transmitting them in the form of stimulation, to where they belong, it utilizes them all, according to external or internal influence and to the consequent demand on this or that organ or function.

The psychic element, whose connections with the physical field is so close that no satisfactory line of division can be drawn, remains.

In spite of any idealistic theory, our only way of grasping the phenomena is to compare them with one another through the exclusive knowledge of our sense organs; so that our consciousness comes to be the feeling of the interrelation between our sense impressions. More than that, there is no way of conveying the conception of "sounds" to the deaf mute, or the conception of "light" to a blind born. The memory itself, this wonderful form of reflex sensibility, is so much a matter of nerve association, as to be broken by the mere destruction of a few nerve fibres (the verbal blindness illustrates the assertion).

Should we analyze language (the only true historian of mankind) we would find that there is not one word, that has not, at least originally, been taken from physical phenomena. The verbs express our way of feeling or of acting, the nouns are either referred to material objects, or,—like the Christian names—to some peculiarity of the body or of its activities, the adjectives correspond to the differentiated capacity of our sense organs and so on. By completing this crude scheme by adding all the metaphorical elements which our faculty of comparing and social intercourse have brought into play, we would still find that there is nothing in our minds beyond our senses.

Far from any intention of depreciating the mental faculties, I only intend to convey the idea, that, once the brain work of association is well understood, we do not need to add a superfluous element (the psychic) to increase the intricacies of the already rather complicated human problem.

After the hasty survey of the nervous system, according to which sensibility, stimulation and association can fully explain all its functioning, we must realize that the ruling factor in our changes is found in the cellular metabolism, as especially determined by the highly differentiated principles, which constitute the endocrine glands.

Taking for an instance the total removal of the thyroid, whose effects are well known to us all, we may state that whatever following change is detected in the organism is exclusively due to the absence of the gland. Again, we can see that from the skin to the vegetative and genital apparatus to the nervous system and to the psychic field, every one of them undergoes the most striking change; and, finally, that notwithstanding a universal syndrome, which implies decided abnormalities in every system of the body, the mere administration

of thyroid suffices to return everything to normal.

Summing up we may infer, that the external world determines a condition of continuous variations, temporary as well as permanent, in our organism, from which none of the elements is totally excluded. The phenomenon—in our differentiated development—is rendered possible through the action of the nervous system, which links together all our organs and functions. Of course, any abnormal change or disease of any organ or in the connecting apparatus is apt to injure the interrelation in a more or less accentuated way, to the detriment of the organism.

The faculty, however, of reacting to external or internal influence—in our present condition not any less than in the monocellular organism—is obtained through chemical action, which is the role of the endocrine system.

CLINICAL ASPECT OF A FEW DEVELOPMENTAL VARIATIONS*

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The carpal scaphoid varies greatly in size and shape. It is a boat-shaped bone situated on the radial side of the carpus, and articulates with the radius proximally, the greater and lesser multangular bones distally, and capitate and lunate bones medially. It arises embryologically from a single group of cells, although von Bardeleben has noted its origin from a double cartilaginous center. Ossification begins about the sixth year from a single center.

As Pfitzner has shown, the bone is composed of two originally distinct elements, a radial and an ulnar scaphoid. These unite early, and it is rare to find them separate at birth, union having usually occurred before this time. Frequently the union is not complete, and we have a partially divided scaphoid, in which the two halves are either only partially united or in which the concave surface is deeply grooved below the dorsum. Rarely the bone is found completely divided, with cartilage occupying the space between the two elements. When this condition occurs, as Pfitzner has pointed out, the line of division usually runs from the outer end of the articular surface for the radius to the middle of the concavity for the head of the os magnum.

The radical externum and the centrale, although closely associated with the form and development of the scaphoid, are not here under discussion.

In regard to this carpal variation Dwight says:

"It must be freely admitted that the great majority of specimens of subdivided scaphoid have a very pathological appearance. Pfitzner is very nearly at the point of denying the occurrence of fracture in any of these cases. I think this is going too far, for the history of lesion is often very precise, and I do not doubt that an undivided scaphoid may be broken. Pfitzner argues very convincingly that a subdivided scaphoid is not a good mechanical arrangement, that the pieces playing one on the other become displaced, that the cartilage degenerates, the surfaces become eburnated, and finally signs of inflammation appear marked by the formation of irregular pieces of bone. To this I would add that a subdivided scaphoid is no



Fig. 1. Congenitally divided scaphoid. (Right hand)

charm against the accidents to which all are liable. On the contrary it makes a slight injury the more serious, as such a scaphoid may be lacerated by violence which would not have broken a normal bone. I am far from questioning the diagnosis in many cases of fracture of the scaphoid. I do not deny that a normal bone may be broken, but I strongly suspect that in most cases called fractures there was a subdivided bone to begin with."

Figures 1 and 2 represent the right and left hands, respectively, of a patient who complained of weakness of the hands. From a radiographic examination the condition was diagnosed (outside of the Public Health Service) as a bilateral fracture of the scaphoid. The patient claimed to have fallen face downward and struck both wrists on the floor. There was a little pain, no swelling, no redness, practically nothing but the subjective weakness of the hands.

On close observation it will be seen that the scaphoid in Figure 1 shows no evidence of reaction to an injury. The line of division between the two halves of the bone is smooth and clean-



Fig. 2. Condition of congenitally divided scaphoid following injury. (Left hand)

cut. There is no callus or new bone formation surrounding the division. In other words there is no evidence of an injury having taken place. The scaphoid is congenitally divided into radial and ulnar halves.

Figure 2, on the other hand, shows the division between the two halves of the scaphoid to be irregular as if the cartilage had degenerated, signs of inflammation are present, the new bone formation being in irregular pieces.

What inference is to be drawn from a study of this case? In the first place the actual occurrence of a scaphoidal fracture is a debated question, at least fracture of a normal scaphoid. But here we have a bilateral division of the scaphoid. One scaphoid clearly shows the results of an injury. The other appears to be quite normal, except for the division into two halves. Only a failure to appreciate the history of the development of the human hand from the foreleg of the lower animals, plus an active imagination, can result in the conclusion that there is a bilateral fracture of the

scaphoid when even the question of a true fracture of the scaphoid is under discussion. The most rational explanation is that there is a congenital bilateral division of the scaphoid into ulnar and radial halves.

The patient went along nicely through life until a slight injury to the left wrist gave him a little pain and a feeling of weakness in the joint. A röntgenological examination of both wrists showed the condition to be bilateral. The patient, then, knowing that the condition was bilateral, and being told that the scaphoids were fractured, complained of weakness in both hands. Undoubtedly the left wrist joint is giving him some trouble. The congenitally weak union between the radial and ulnar scaphoids has become still more weakened, the cartilage has degenerated and inflammatory signs are present with irregular new bone formation. The patient is having trouble not only on account of an injury, which probably was slight, but mainly because of a congenital handicap. The right scaphoid is mechanically weak. A slight injury will separate the two halves completely, or the cartilage will degenerate and an inflammatory condition result. Such a congenitally weak joint should be protected as much as possible from injury.

The human pre-hallux (tibiale externum) is a supernumerary bone of the foot discovered by Bauhin in 1605, and has been known since the time of Luschka under the name of tibiale externum. This ossicle occurs in about ten per cent of all feet. When it does occur in the majority of cases it is bilateral. It is found with great frequency in the lower animals and there is no doubt it is an ossicle which is slowly, but surely, dropping out of the human foot. Monahan takes a peculiar stand in regard to the supernumerary ossicles, especially with reference to the tibiale externum. He says:

"The pre-hallux in human feet has two possible interpretations: (1) It may be regarded as an evidence of diseased and degenerate feet whose degeneracy allows old and once-atrophied structures to redevelop; or (2) it may be looked upon as Nature's normal and healthy effort to brace a rapidly abducting member and adjust it to its ever-increasing responsibility. Thus it is an open question whether the human pre-hallux is a revision to a lower ancestral form or whether it represents a further stage in evolution and foreshadows a future, normally six-toed human foot.

"If the first interpretation is correct the pre-hallux should appear only in association with some degener-



Fig. 3. Tibiale externum.

ating disease, a history of which, by sufficient thoroughness of investigation could be obtained. If the second is correct the pre-hallux-bearing foot should be a healthy, normal member, the advance agent of a more efficient human foot-type.

"Again, if the first hypothesis is correct we should be able to find traces of the old 'ancestral form' among the direct ancestors of the human foot, and, according to the teachings of convergent evolution, they may appear among the members of other orders and other groups as well. That these traces exist in ample measure is shown by the animal series that follows. If the second hypothesis is correct, the pre-hallux, as Nature's adjustment of individual form to function, should appear only when a similar function makes necessary a similar adjustment. Since man is the only animal who has so far perverted his feet as to make them inadequate to the duties imposed upon them, we should, in this latter case, expect to see the pre-hallux only in human feet.

"My observation of pathological conditions coexistent with the pre-hallux, as well as my original researches among the foot structures of lower vertebrates, lead me to incline toward the former theory, namely, that the human pre-hallux signifies reversion to lower form, brought about probably by constitutional disease."

To begin with, it is news to the human race that "man has so far perverted his feet as to make them inadequate to the duties imposed on them." To most embryologists the human foot is constantly becoming more adapted to the tasks imposed on it. The modern conception of evolution is that progress is always being made toward greater efficiency, and not the reverse, and the presence of the tibiale externum in the human foot can not be regarded "as an evidence of diseased and degenerate feet whose degeneracy allows old and once-atrophied structures to redevelop."

In a dissection of a number of hylobates syndactylus, Kohlbrugge found that the pre-hallux articulates between the first metatarsal and the internal cuneiform (nine cases). In one hylobates syndactylus the pre-hallux was apparently fused with the metatarsal, appearing to be, consequently, part of a true tarsal bone. It would seem, therefore, that in *H. syndactylus*, the position of the pre-hallux is about the same as in the kinkajou. The finding of the bone in a divided condition by



Fig. 4. Tibiale externum.

Pfizzner serves to still further confirm the theory that it is part of a ray that is dropping out of the foot of many animals as well as man.

Figure 3 shows the injured foot of a veteran in which the tibiale externum is well developed. It does seem strange that this ossicle should develop coincident with disuse due to injury.

Figure 4 shows a perfectly normal, healthy foot of a young adult. This boy at no time has complained of any foot trouble. It would certainly require a wonderfully active imagination to conclude that he has "diseased and degenerate feet" merely because of the presence of a normal supernumerary ossicle. From the intensive study made of the supernumerary bones of the hands and feet by Pfizzner, Dwight, and others, there is but one conclusion that can be drawn of their presence. They are not developed to meet certain physical requirements of the adult. This is evidenced by the fact that they are present as cartilaginous nodules in the fetus and in greater numbers than in the adult. According to Thilenius they are to be regarded as integral parts of the skeleton phylogenetically inherited.

The triangulare, as figured by Pfizzner, lies between the radius and ulna above and the semilunar and cuneiform below, distal to the triangular cartilage. It is one of the rarest of the supernumerary carpal bones, although Thilenius found it in sixty-five percent in the second month of embryonic life.

Owing to its rarity it is not of great clinical importance, but in dealing with injuries of the hand and wrist it must be kept in mind that the ossicle occurs in this position, and must be differentiated from a fracture.

Figure 5 shows a smooth, oval ossicle distal to the styloid process of the ulna. There is no history of an injury or other cause of a pathological condition of the wrist. The radiograph was taken merely for comparison with the other wrist. There can then be but one inference, namely that this ossicle is a small, supernumerary bone, the triangulare.

For comparison, Figure 6 shows an injured wrist with a fracture of the ulnar styloid. The fragment lies above the triangular ligament in close opposition to the ulna. It is too high to be a triangulare, and in view of its appearance and the history of an injury, there is no difficulty in making the diagnosis. Difficulty in interpretation will arise only when there is a history of an injury,



Fig. 5. Normal hand showing triangulare.

with a bone lying below the triangular ligament. Then it will be necessary to make the differential diagnosis between a secondary pisiform, triangulare, and fracture; a very difficult situation.

CONCLUSIONS

Fracture of a normal scaphoid is a very unusual occurrence.

Most scaphoidal fractures are superimposed on an imperfectly developed bone, usually one which is already partially divided.

The tibiale externum (pre-hallux) is probably the reappearance of one of the bones of a ray of the foot which has not finally dropped out.

The tibiale externum is not developed as the result of a pathological condition of the foot.

The triangulare is rarely seen, but it can be differentiated from a fracture by the history, appearance and position of the ossicle.

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GOITER SURGERY*

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Fig. 6. Fracture of ulnar styloid.

In no other branch of surgery has there been the marked advancement, with such phenomenal reduction in mortality rate as in surgery of the thyroid gland. It is perhaps safe to say that the last decade has witnessed more actual progress in the study of thyroid disorders than has all of the time intervening since Parry first described exophthalmic goiter in 1786.

About a half century ago Gross, (quoted by Halsted and Frasier) in giving his opinion of the surgeon who might attempt the removal of a goiter, wrote as follows: "Every step he takes will be environed with difficulty, every stroke of his knife will be followed by a torrent of blood, and lucky will it be for him if his victim live long enough to enable him to finish his horrible butchery. Thus, whether we view this operation in relation to the difficulties which must necessarily attend its resection, or with reference to the severity of the subsequent inflammation, it is equally deserving of rebuke and condemnation. No honest and sensible surgeon, it seems to me, would ever engage in it."

In the March, 1921, issue, "Surgery, Gynecology and Obstetrics," Crile, reported an unbroken series of 461 thyroidectomies and litigations without a death.

Comparing these views of fifty years ago with the facts of today, one is inclined to ask, what, if any, one factor was most concerned in making such improvements possible. In a careful review of the literature one finds the answer. Everywhere the names of Kocker, C. H. Mayo and Crile stand out prominently. It is to these masters, together with such men as Mobius, Marine, Wilson, Plummer and Kendall that the goiter world of today owes its greatest debt. Through the effort of these workers the operative mortality in all types of goiter requiring operation has been reduced to less than 2 per cent. The problem which confronts us as average surgeons is how are we to keep within these limits.

With increased experience one comes to realize more and more that goiter surgery differs from

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that of almost any other branch, in that we have here a condition which may assume one of several types; each of which require separate and special consideration. With our present conception of goiter it would seem that a thorough understanding of these various types is of first importance. When thus familiar, and not until then, one has a working basis for the study of thyroid disorders.

For clinical study, i. e., for preoperative diagnosis, also as a basis for treatment, goiters can be divided into the following groups: I, simple or colloid goiter; II, simple adenoma; III, toxic adenoma; IV, exophthalmic goiter.

Take the patient as she first appears at our office. If under the age of maturity, say from 14 to 20, it is reasonably safe to assume that she has a so-called adolescent goiter. Enlarged thyroids coming under this term are usually diffuse colloid, may be adenomatous or a combination of the two, the colloid almost always predominating. It is a well known fact that goiters of this type often disappear spontaneously or respond readily to medical treatment. Marine has shown that goiter of the adolescent type can be prevented by the administration of iodine and that this type, when fully developed, can often be cured by the same treatment. Surgery is indicated in these cases, only, when internal medication has failed and the gland continues to enlarge to a point where pressure from the tumor causes marked discomfort. Occasionally a condition of true hyperthyroidism develops in this type of goiter. Whether this is due to hyper-function of the adenomatous areas, in the mixed type, or an over secretion of the surrounding gland tissue, as a result of stimulation (possibly by the colloid) is not definitely known.

Another group of symptoms closely resembling those of hyperthyroidism sometimes appears in this type of goiter; this syndrome, perhaps the least understood of all thyroid conditions, is apparently not due to over-secretion of the thyroid hormone, but is caused, according to some investigators, by absorption of the products of degeneration. The patients in this group present nervous manifestations similar to those of hyperthyroidism, but the nervousness differs from the latter, in that it is more like that found in the psychoneurotic person with tremor and tachycardia. The basal metabolic rate is normal. Cases of this type can often be cured by medical treatment.

If our patient is beyond the adolescent period, we may expect to find any one of the conditions

coming under groups II, III and IV. Occasionally a pure colloid goiter will continue into adult life; more often however, there is a combination of colloid and adenoma. It is estimated that 40 per cent of all simple adenoma become toxic sometime during the life of the patient. (Judd.)

Simple adenomas occur at almost any time of life but usually make their first appearance during the third or fourth decade. Plummer is of the opinion that the majority of adenomas have their inception in colloid goiter. Lending weight to this theory is the fact that clinically adenomas often begin during, or closely following, the latter part of the adolescent period, which is within the time that the colloid goiter not infrequently disappears spontaneously. It seems possible that stimulation of the surrounding thyroid tissue by the colloid may excite the formation of new adenomatous tissue. If this theory has any foundation, one might assume that the new adenomatous tissue thus formed takes the place of the colloid as the latter is absorbed.

Clinically, adenomas usually cause a more or less uniform enlargement of both lobes. If one lobe is much larger, there is apt to be a cystic degeneration of colloid or adenomatous areas. Because goiters of this type are not usually disabling, it is at times somewhat difficult for the conscientious surgeon to decide on the treatment to advise.

Since colloid goiter can usually be cured by medical treatment, because this type sometimes occurs during adult life, and because it is often impossible to differentiate clinically between colloid and adenomatous goiter, particularly the mixed type, it would seem only fair to the patient to defer surgery in early adenomatous goiter until medical treatment has had a fair trial. On the other hand, when we consider the fact that 40 per cent of all simple adenomas become toxic sometime during the life of the patient, that perhaps 20 per cent more suffer from pressure or other discomforts, that all are more or less disfiguring and that the operative mortality in this type is practically nil, it would seem that our internist colleagues might withhold censure, if perchance we operate upon a case that possibly could have reached the end of her allotted three score years and ten without a thyroidectomy.

For many years a form of goiter with symptom complex similar to the exophthalmic type was recognized by clinicians. Although differing somewhat from the true Basedow's disease, particularly

by the absence of exophthalmos it was nevertheless considered and described by many as an atypical or incomplete form of exophthalmic goiter. While admitting that the symptoms were similar, that the toxicity in each condition was probably due to alternation or over-production of the thyroid secretion, and that results from the same treatment were almost equally good in both, a few of the more careful observers were unwilling to accept the so-called false goiter as an atypical or aberrant form of what had long been known as true exophthalmic goiter.

In 1911 and 1912, Plummer, after careful investigation of a large number of cases, showed conclusively that the two syndromes differed from each other, not alone in some of the essential symptoms but also that the pathology in the two conditions is not the same. He called attention to the fact that the exophthalmos, present in the majority of cases of true Basedow's disease, is rarely if ever found in the other; that the gastro-intestinal disturbances often occurring in the true exophthalmic goiter seldom appear in the false and that there is a distinct tendency to hypertension in the atypical form which is unusual in exophthalmic goiter. In true exophthalmic goiter, there is diffuse parenchymatous hypertrophy and hyperplasia while in the atypical form there is hypertrophy, but the pathologic changes are confined to new growths or adenomas in the gland. Rarely there is both clinical and pathological evidence of toxic adenoma and exophthalmic goiter in the same patient at the same time.

Correlating the clinical and pathologic findings of these two syndromes separately, it was clearly demonstrated that they represented two distinct types of toxic goiter; one the true exophthalmic goiter, the other the thyrotoxic adenoma. With the identity of toxic adenoma thus established, Plummer sought to show the clinical and pathological relationship of all types of goiter by dividing them into four groups: I, non-hyperplastic atoxic; II, non-hyperplastic toxic; III, hyperplastic atoxic; IV, hyperplastic toxic. While this classification is more comprehensive, it seems that for clinical purposes the simpler one used by the writer is preferable.

Surgical treatment of goiter should be considered from the standpoint of: (1) Diagnosis; (2) Pre-operative treatment; (3) Anesthesia; (4) Operative technic; (5) After-treatment.

Confronted with a patient, presenting an en-

larged thyroid, it is of paramount importance to determine the type of goiter from which she is suffering. In the absence of complicating phenomena, such as are indicative of thyroid toxemia, one may assume that she has a colloid goiter or simple adenoma. If, however, there are nervous manifestations and perhaps other indications of toxicity, we must at once consider the possibility of exophthalmic goiter or toxic adenoma; here the goiter may be large or small and occasionally in exophthalmic goiter there is no palpable tumor; in these types, particularly exophthalmic goiter the patient seldom refers to her goiter as the possible cause of her discomfort; the eyes are bright, there is often a flush, which in the early stages may be mistaken for indication of good health; she is animated, has full confidence in her strength and believes herself physically entirely well. To the careless observer or to one inexperienced in thyroid conditions, the above, rather ill-defined symptoms are apt to be misleading and may be a stumbling block in the way of correct diagnosis. If, however, the examination is carried to a point beyond mere observation one will invariably find unmistakable evidences of hyperthyroidism; together with those indicated above they are exophthalmos, nervousness, tremor, loss of strength, (particularly in the extensor muscles,) loss of weight, gastro-intestinal disturbances, increased appetite, vasomotor disturbances, palpitation, tachycardia and later myocardial degeneration. Any or all of these symptoms may be present, depending on the degree of toxicity, and the stage of the disease.

The differential diagnosis between exophthalmic goiter and toxic adenoma has been previously considered; but to recapitulate briefly: exophthalmos is present in about four out of five late cases of exophthalmic goiter and rarely if ever in toxic adenoma. Gastro-intestinal disturbances which are often present in exophthalmic goiter are not so apt to occur in toxic adenoma, and hypertension which is usually present in some degree in toxic adenoma is seldom found in exophthalmic goiter. Basal metabolism, while always increased in toxic adenoma is not usually as high as in exophthalmic goiter; acute crises are not so apt to occur in toxic adenoma as in exophthalmic goiter. C. H. Mayo, quoting Plummer, states that "enlargement of the thyroid was noted from five to ten years earlier in life by the patients with non-hyperplastic goiter than by the patients with hyperplastic (exophthalmic) goiter; in cases of exophthalmic goiter the symp-

tems of hyperthyroidism followed the appearance of the goiter with an average of nine-tenths of a year, while in cases of non-hyperplastic adenoma with hyperthyroidism an average of fourteen and one-half years elapsed before the symptoms of hyperthyroidism appeared." The syndrome referred to under colloid goiter, which is thought to be due to the absorption of the products of degeneration and which is amenable to medical treatment, must not be overlooked in its true form and mistaken for exophthalmic goiter or toxic adenoma. One must also remember that there is a condition resembling acute hyperthyroidism which is caused by the ingestion of thyroid extract or iodine; this "artificial Basedow's" gradually disappears after the cause is removed.

The scope of this paper does not permit a detailed discussion of the various diagnostic tests used to determine the presence or degree of toxicity. This phase of the subject, particularly basal metabolism, has been so thoroughly discussed in recent papers by Plummer, Benedict, Lusk, Boothby, Means and Du Bois* that it would be superfluous for one of less experience to attempt to add anything at this time. Suffice to say that in our work, basal metabolism has been of inestimable value, both as a means of differential diagnosis in obscure cases and as an aid in determining the degree of toxicity.

The Goetsch or epinephrin test has been so variable in its action that we no longer use it as a routine. In connection with positive clinical signs and increased basal metabolism, it is partially confirmatory, but alone is unreliable.

Lymphocytosis as pointed out by Kocher, no doubt bears some relationship to the degree of toxicity, but on account of the same blood picture appearing in other thyroid conditions this test has only relative value.

We have not had sufficient experience with the other tests to venture an opinion.

While we would feel badly handicapped if obliged to do goiter surgery without the aid of these tests, particularly basal metabolism, we nevertheless fully agree with Crile when he states that "the most important points are taking a careful history and making a careful physical examination. After that the basal metabolism rate is of great importance, but I would not regard it as being of pathognomonic importance, nor would I classify

exophthalmic goiter only on basal metabolism rate. We feel that the best guide, after all, is the judgment of the surgeon or physician. The basal metabolic rate will tell you what rate of expenditure the body is making, but it does not tell you how much reserve there is in the myocardium, in the liver and the central nervous system."

Preparatory treatment is second only, in importance, to diagnosis; here the condition, of course, and the habits of the individual patient must be considered. Non-toxic goiter patients when otherwise physically well need no special preparation and can usually be operated upon with safety the day following admission to the hospital. Toxic goiter patients should never be operated at once, but must be kept under observation and treatment for an indefinite period, varying from days to months, the time depending on the improvement. The question of medication and other means of treatment have been much discussed, with no definite conclusion. Quinine, ergotine, bromides, belladonna, digitalis and other drugs all have their advocates. X-ray has had extensive trial, with questionable results. When all is said and done, absolute rest in bed, freedom from excitement and worry, confidence in the attendants, with digitalis to bolster up the failing heart and other drugs as indicated, comprise a treatment, which, if continued long enough, will usually bring results. Occasionally, however, there is not sufficient improvement to permit a primary thyroidectomy. The nervousness does not subside, the pulse remains rapid, basal metabolism continues high; in fact the picture of a high degree of toxicity remains. Here the question of ligation of the superior thyroid arteries presents itself, and here again a question of good judgment on the part of the surgeon. Basal metabolism is often a reliable guide in the course to pursue; it is a fairly safe rule to ligate when the basal metabolic rate is above plus 50; it is not safe, however, to rely wholly on basal metabolism, for occasionally the rate may be low and yet a primary thyroidectomy would be dangerous. We all remember the old rule in abdominal surgery, "when in doubt drain." This rule changed to read, when in doubt ligate, cannot carry one far amiss in goiter surgery. Thyroidectomy should never be done during an acute exacerbation in exophthalmic goiter.

Indications for surgical treatment of colloid goiter needs no further consideration. Simple adenoma in the early stages should be given a trial

*Journal A. M. A., July 30, 1921.

with medical treatment. If, after a reasonable length of time there is no relief, or, if of long standing, in the absence of complications the removal of the gland is largely a matter of choice with the patient. When the tumor causes discomfort through pressure or on account of the weight, a thyroidectomy should be advised. Judd states that "thyroidectomy will cure more than 65 per cent of patients with the more severe types of thyroidism (exophthalmic goiter), and that more than 80 per cent of the patients with adenoma with hyperthyroidism can be relieved of their toxic symptoms and a cure obtained by thyroidectomy." He adds that a higher percentage of cures would undoubtedly be obtained if the cases received proper attention sooner and were operated earlier. Judging from our own limited experience, we believe Judd's estimate of cures is rather too conservative. At any rate the results are too striking to require further argument in favor of surgery, as compared with continued medical treatment.

The veritable mountains of literature on anesthesia in goiter surgery, which has appeared in the last few years, is convincing evidence that this question is far from settled. In some clinics ether is used exclusively, in others local anesthesia has the preference and in still others nitrous oxide is the favorite; and again, there are advocates of a combination, as local anesthesia and nitrous oxide. We have no quarrel with any of these contenders so long as the anesthetic used is the best and safest that the particular surroundings will permit. For example, if one has an anesthetist who is skilled in the administration of ether, and ether alone, then ether is the safest. In certain conditions, as diabetes and other debilitating diseases, in the absence of extreme nervousness, local anesthesia is the anesthetic of choice; but with an expert in nitrous oxide anesthesia, the latter is, in the writer's opinion, by long odds the safest and most desirable in every way. We have used nitrous oxide exclusively in goiter work for the past six years and are more than satisfied with the results. We give a hypodermic of morphine gr. 1/4 and atrophine gr. 1/100, one-half to one hour before the patient is brought to the operating room. Nitrous oxide anesthesia; as the anesthetic is discontinued morphine gr. 1/6 hypodermic. The patient leaves the operating room wide awake, and almost always greets us with a smile when making the rounds after the morning's work. The average time in the hospital after the operation is six days.

Operative technic is what the individual surgeon makes it. To follow hard and fast rules laid down by some one else, would, to say the least, preclude the best results in all cases. A successful technic in goiter surgery can only be gained by close observation and experience. With this fact in mind only a few minor points which strike us as being important will be mentioned. In our work the Balfour technic has the preference, with such modifications, of course, as the individual case requires. A primary division of the isthmus is made when conveniently possible, turning the lobe outward, we believe there is less danger of injury to the trachea and the recurrent laryngeal nerve by this method, and that bleeding can be better controlled. Excepting large cysts which are limited to one side we always do a partial resection of both lobes. We rarely cut the sternohyoid and sternothyroid muscles. We have never had a case where it seemed that too much thyroid tissue had been removed. Particular attention is paid to hemostasis; the patient is allowed to become partially awake (from nitrous oxide) after all bleeding is thought to be controlled; the strain while awakening will cause bleeding from any vessels not properly secured. Drainage is provided by a double split rubber tube; i. e., the tube, of any size desired, is split on both sides about one and one half inch. One lip of this tube is placed down to the trachea or goiter bed; the muscles are then united over the trachea, and the other lip of the tube placed between these muscles, behind, and the platysma and skin in front; the intact end of the tube, about three-fourths inches in length, is brought out through a stab wound in the center, below the incision. The goiter bed and the space between the ribbon muscles and the platysma are thus drained by one tube, through the same opening. Instead of removing the drain after forty-eight hours, as formerly, we leave it until the third day.

In dressing the wound, small pads or a number of sponges are placed over the space on either side of the trachea beneath the regular dressing; this is for the purpose of pressure to keep the raw surfaces in apposition and to prevent accumulation of blood and serum; this apparently insignificant detail is considered important because in one of our early cases neglect of this precaution resulted in the death of the patient four hours after the operation; pressure from a large clot which had formed caused collapse of the trachea. In toxic cases, hypodermoclysis of normal saline solution is giv-

en; the needles being inserted after the patient is asleep and the solution allowed to enter slowly while the operation is in progress.

The average thyroidectomy requires little after-treatment. In the absence of complications the patient should be able to leave her bed on the fourth or fifth day. In event however that so-called post-operative hyperthyroidism follows the operation prompt and energetic treatment is necessary. In the presence of high temperature, rapid pulse and respiration and the usual extreme excitement, the treatment with ice-packs as advocated by Crile, gives results that border on the phenomenal; we have used this treatment in a number of cases and can testify to its merits.

The foregoing paper is based on experience gained in approximately 230 thyroidectomies. In an early series of about forty cases, of which we have no record, there were three deaths. In the later series of 194 cases there were two deaths. The first patient of the last series was the one mentioned as having died from the formation of a clot with resulting collapse of the trachea from pressure; thus leaving 193 cases with one death. The latter was a woman 66 years of age with advanced nephritis and myocardial degeneration. She had an enormous substernal adenoma which caused pressure to the extent that she was cyanosed and greatly distressed from dyspnea. Thyroidectomy was done under local anesthesia. She stood the operation well, and obtained almost instant relief but died suddenly two hours later apparently from collapse of the trachea.

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DISCUSSION

DR. ARNOLD SCHWYZER, St. Paul: Dr. Plondke has given us in a short space of time a review of the whole subject of goiter. It is a gigantic task to speak on the goiter problem in that short time. When we figure that he had 194 cases, with only 2 deaths, we must consider his results splendid.

He mentioned the point that in the last ten years goiter surgery has really taken proper hold of our interest. That is quite true. In the last ten years an enormous amount of work has been done, and goiter surgery has become very popular in the West, due to some of our great leaders. But just for the sake of history, I would like to say that twenty-five years ago I remember how Kocher felt badly when he had one death out of several hundred cases. Twenty-four years ago I remember he showed one day in his clinic ten patients with large goiters. They were then operated upon and the following week these ten patients were lined up in the lecture room without any dressings except a small collodion gauze strip. The mortality at that time in the hands of master surgeons was already very low.

I am glad Dr. Plondke mentioned one important thing that was brought out by Marine, the possibility of avoiding the frequency of goiter by giving school children in the goiter zones iodid of sodium. This has been taken up in Switzerland since Marine brought it to the attention of the profession and it has been given attention very intensively. Over there they prepare the iodid in chocolate tablets to give the school children.

We may hope for our future generations an enormous reduction in the number of goiters, and America can be proud of having accomplished that.

The doctor did not have time to speak, for instance, of intrathoracic goiters; nor did he speak of malignant goiters, but just there I would like to mention one thing. If we have, in a patient of forty or more years, a goiter that begins to be painful and begins to become hard and a little nodular, it is a wise thing to think of carcinoma even in the presence of slight fever. You should not make too readily the diagnosis in a more or less harmless subacute thyroiditis, which may be treated by procrastination, but if there is a hard nodular condition think of carcinoma, because it is only early treatment that will do any good.

The doctor in describing his technic mentioned the fact that he has never had any trouble from the removal of too much tissue. I have seen him operate and I know how careful he is. A short time ago I saw a case of tetany in my office, and I mention this to warn those who are too ready to take everything away. This patient a lady, had tonic contraction in her arms and hands. She had been treated with parathyroid with this very insufficient result. She had been a stenographer and was, of course, not able to take care of herself. It was a strange thing that with the addition of large doses of calcium, that spasm disappeared rapidly within twenty-four hours. Unfortunately I have no later report.

As to the deaths the doctor had, they were from collapse of the trachea. He thinks that a lack of application of pressure by the dressing was the cause of hemorrhage, but I do not think so. Forces, such as vomit-

ing, which will make postoperative bleeding, are stronger than any little pressure against the neck can overcome. A straining motion will do very much more than a dressing can readjust. I have done goiter surgery for twenty-five years. Of the non-toxic goiters, including intrathoracic goiters and the carcinomatous goiters, I have lost one case, and this was also due to collapse of the trachea (intubation followed by severe bronchiolitis). I think that what Dr. Plondke had to deal with practically, was collapsing of the trachea not due to too much bleeding, but due to a softening of the trachea by the pressure of the goiter. If we have a goiter that presses on the trachea we get degeneration of the cartilage rings, which is a myxomatous degeneration, and that the trachea can collapse in inspiration. In my last operation this accident happened again. The anesthetist told us that the patient was in a bad condition; she had that disagreeable inspiratory stridor and was dark blue. We put a silk-worm gut suture on each side through the goiter stump and pulled on them. We could then close the wound up; the silk worms emerged from the angles of the skin wound. As long as we held these sutures the patient was in fine condition, and when they were let go, she was shocked. A very short while after closing the wound the patient was all right, and the next day we could pull out the strings and the wound healed. This seemed better than suturing the sides of the stumps to the muscles. You are in better control of the situation.

DR. T. L. CHAPMAN, Duluth: One of the most interesting of all the phases of goiter surgery, is the impossibility of estimating, with entire exactness, any given result of surgical attack. Only recently has it been well understood that there are no laboratory tests, no matter how significant and enlightening, of the speed, severity, and phase of progress in exophthalmic goiter,—that can take the place of the general clinical estimate, made with the aid of the eye, the ear, and the understanding of the examiner. The attitude of the patient, his morale toward his enemy the disease, the natural history of the disease itself, and its oncoming exacerbations and declines in toxicity,—all of these factors are of much more import than the mere rate at which his disease is consuming him. Crile has lately expressed the opinion that, as an estimate of operability, the basal metabolic rate is certainly not to be depended upon, and other noted clinicians have argued to similar purport.

I find myself in interested agreement with Dr. Schwyzer's remarks concerning the dramatic and immediate cure of the pulmonic disabilities attendant upon the removal of large substernal growths, some of which have produced severe pressure symptoms perhaps for twenty years, with the usual diagnosis of asthma. Nothing could be more satisfying to surgeon and patient than a well conducted diagnosis and treatment of a case of this kind.

It is a pleasing commentary upon the success attending goiter surgery that many patients, with what in time will become toxic or mechanically interfering adenomas, are led by the safety of the procedure, to come for removal of the unsightly growths, at a time much before the possible toxicity has manifested itself to a dangerous degree. Formerly these cases were seen for the first time, with severely injured myocardial competency, dyspnea, edematous ankles and albuminuria, and their cure in conse-

quence was much more problematic than if it had been attempted at an earlier stage. Nevertheless it is amazing to what a degree of health just this type of patient can be brought by the act of gentle removal of his hyperfunctioning adenomatous tissue, with the aid of local anesthesia, nitrous oxide analgesia and the necessary rest and medical stimulation of the vascular and renal functions. Even when in extremis, a fair proportion of these patients are restored to useful life and reasonable activities.

With regard to the actual death rate of goiter surgery, it certainly is becoming less year by year, and constant improvement in technical details of management of these cases is recorded in the enormous literature. One feature remains, to my mind, a grievous drawback to exact prognosis in goiter surgery, and that is the question of persistent thymus. Within the brief period of a year, it has been my misfortune to have the entire mortality represented by three of these cases, two proven by autopsy, the other clinically corresponding. In one the thymus weighed 60 grams, in another 70 grams. It has long been known that persistent thymus occurs in a high percentage of goiter subjects, both of Basedow's disease and others; the earlier writers, influenced by a copious post-mortem experience, produced ample evidence of this fact. Of late the subject has not been so constantly referred to; nevertheless, it still deserves much consideration in view of the probability of sudden death when an anesthetic of any kind is given to this type of patient. In Kocher's *Operative Surgery* this phase of prognosis is considered and it is advised that the sternal region be percussed out, the suprasternal fossa palpated, the throat be inspected for tonsillar hypertrophy, and the spleen be investigated,—lest one lead his patient to an unjustifiable situation. Still, if the use of the roentgen ray be added to these investigations, it is so rare as to be almost unique that a diagnosis of persistent thymus can be made with accuracy, and, until this can be done, there must be some unexpected, sudden and distressing deaths. It is a matter of much significance, in taking a history, that a patient with Basedow's disease, assures the examiner that he never underwent an illness of any severity whatever. These are cases to fear, as it is well known that these individuals with persistent thymus very commonly die in any stress of disease whatever. Additional peculiarities of these individuals is that they are usually notably well-grown, handsome, and with fine teeth, skin and hair. All cases of this kind are not impossible of diagnosis. From time to time a large thymus can be visualized fluoroscopically, or upon the roentgenogram; but, by far the greater number will be missed, no matter what aids of mechanics or intellectual effort is brought to bear.

DR. STEPHEN E. WILLIAMS, Chippewa Falls, Wisconsin: I had the good fortune to be with Crile for ten days, and I saw him break his neck, as he said, in trying to save a patient. His 497th case of goiter died; it was a case of toxic adenoma, and his 503rd goiter case died while we were there. He asked us to go home with one thought in view, and that is to try to stop the development of

goiter. He has devoted a good deal of attention along with his assistant and Dr. Marine toward the prevention of goiter, and it is an interesting story to hear him speak of the opposition they have met in Akron, Ohio, and in Cleveland, against the efforts they are making to have the school children take sodium iodid. They use sodium iodid universally in all the schools at Akron, Ohio, and in Cleveland. The Christian Scientists are fighting this movement very hard. Every medical and surgical association should take an interest in this subject and bring it up. I think we have lost sight of the fact that if we do not put our shoulders to the wheel and prevent this, as Dr. Willard Bartlett says, we will be a race of degenerates. Willard Bartlett in a paper read before the Wisconsin Surgical Association stated that the people in the Great Lakes region were suffering from an epidemic of goiter very much the same as they had in Carthage and Rome, and that the United States suffered from an epidemic of goiter many years ago. He claimed that goiter was undermining our race in the Great Lakes region, and spent one evening to prove to our satisfaction that there is something in it, and that it is a simple matter to feed children something that will prevent it.

I think the paper of Dr. Plondke is one of the finest contributions I have ever heard.

A MEMBER: How much sodium iodid is given to these children and how long is it continued?

DR. WILLIAMS: They are given 2 grains of sodium iodid, once a day, for two weeks at the beginning of the school year and at the end of the school year, and every child should have the same dose. The children stand it better than girls in high school, and those are the ones in whom we may expect to have cases of exophthalmic goiter on our hands at any time. The children stand the sodium iodid better.

DR. F. J. PLONDKE, (closing): In attempting to cover the whole subject of goiter in a limited paper, many of the important points are necessarily touched upon too lightly, and others as thyroiditis, cancer and intrathoracic goiter were purposely omitted.

In my statement regarding the improvement in the last decade, I had reference mostly to the purely scientific side of the subject, namely such work as that done by Crile, Plummer, Kendall, Marine and Kimball. We must all admit that Kocher, considering his time, had technic superior to any yet developed.

In the case mentioned as having died from collapse of the trachea, the wound was opened after death and a large clot found pressing the sides of the trachea together.

We are sure that our low death rate is not due so much to operative technic, as our ability after careful study to differentiate between the various types of goiter and thus by preparatory treatment get the severe cases in good condition for operation.

I wish to thank Drs. Schwyzer, Chapman, and Williams for their frank discussion.

PYEMIA OF OTITIC ORIGIN*

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There exists among otologists a consensus of opinion that systemic infection originating in suppurative disease of the middle ear is of far more frequent occurrence than is generally supposed. This conclusion is fully warranted by the numerous reports in recent otological literature of anomalous cases of lateral sinus thrombosis which were unrecognized before operation or autopsy. This opinion seems all the more credible in view of the natural reticence which prevails regarding the reporting of cases having an unfavorable outcome, and from the further fact that many such cases are entirely overlooked because of the infrequency of post-mortem examinations, except in clinical centers.

One of the noteworthy achievements of modern otology has been the marked reduction in mortality from complications of middle ear supuration. A still greater reduction in mortality will result from a more widespread knowledge of the nature of these complications by the man in general practice. It is with the purpose of pointing out the importance of its early recognition, and of calling attention to the most important points in the diagnosis and treatment of otogenous pyemia that we have chosen this subject for presentation before this Society. Lack of time permits only the briefest consideration of the outstanding features pertaining to this condition, with only casual reference to cases which have recently come under our personal observation. These cases are soon to be reported before another society composed of oto-laryngologists.

A pyemia of greater or lesser severity, with but few negligible exceptions, is an inseparable feature of every case of infective lateral sinus thrombosis. For practical purposes the terms lateral sinus thrombosis and pyemia of otitic origin are therefore synonymous. We have employed for this paper the latter title only because it is the more comprehensive term. Though it is well known that we may have systemic infection from a suppurating ear without any sinus involvement,

we must accept a lateral sinus thrombosis as the usual avenue of infection of the blood stream.

Occurrence and Pathology: Lateral sinus thrombosis, with its associated pyemia, is the most frequent endocranial complication of suppurative middle ear disease. Of 1100 operations on the temporal bone performed by Gerber¹, forty-one were for lateral sinus thrombosis. Twenty-five were associated with acute infections, and sixteen resulted from chronic otitis. Mygind², reporting seventy cases of lateral sinus thrombosis, found it more frequent in males than in females, in the proportion of thirty-seven to thirty-three. Two-thirds of his cases were under fifteen years of age, a significant fact, since individuals under this age constitute only one-third of our population. Among infants and very young children, it is a much less frequent complication than brain abscess or meningitis. The right sinus is more often affected than the left, probably because of its larger size and deeper situation, whereby it is more exposed to infection within the temporal bone.

The majority of cases of lateral sinus thrombosis originate in a mastoiditis. Many (in Mygind's series 60 per cent) are associated with a perisinus abscess, with a confluent mastoiditis. Not infrequently, however, the phlebitis is the result of a direct extension of the infection from the overlying bone. Kopetsky³ has called attention to its frequent occurrence with the hemorrhagic type of mastoiditis, characterized by marked inflammatory involvement of the bone, but without cell wall destruction. These cases are often encountered in influenza and show an early tendency to metastasis. In such cases, the thrombosis begins in the veins of the mastoid, extending thence into the sinus. Koerner has described an osteo-phlebitis of the mastoid which may give rise to pyemia without gross involvement of the lateral sinus. This condition was found in five of Mygind's cases.

A thrombo-phlebitis occurs at times primarily in the jugular bulb through extension of the infection from the floor of the middle ear. This is apt to occur in young children.

The inflammatory changes in lateral sinus thrombosis are not unlike those of a thrombo-phlebitis elsewhere in the body.

Lateral sinus thrombosis may terminate in any one of five ways, according to Braun⁴:

1. The patient dies of general sepsis before the clot breaks down.

*Presented before the Minnesota State Medical Association, Duluth, Minn., August, 1921.

2. The clot breaks down in the center and perforates the outer sinus wall, discharging into the cavity of the perisinus abscess.

3. Perforation takes place toward the cranial cavity, resulting in a meningitis or cerebellar abscess.

4. The thrombus may organize and cause obliteration of the sinus.

5. The thrombus may be absorbed with recanalization of the sinus.

The streptococcus hemolyticus is the bacteriological cause in over fifty per cent of cases of pyemia of otogenous origin, next in frequency being the streptococcus mucosus. Leutert believes that every case of otitis which shows a bacteremia has sinus involvement, while Libman has shown that bacteremia is present at some time in every lateral sinus thrombosis, except in the rare cases in which the thrombus has remained sterile from the beginning. Both Brieger⁵ and Kobrak report cases of pyemia with metastatic abscesses in which at post-mortem no thrombus was present. One of our fatal cases was of this type. Libman⁶ has demonstrated that bacteremia is most likely to be present during or just after a chill, and that it disappears within a few hours after drainage of the sinus and ligation of the internal jugular vein.

Symptoms and Diagnosis: A typical case of pyemia of otitic origin presents no difficulties of diagnosis, when it is accompanied by the classical symptoms of an intermittent fever, with chills and profuse perspiration, a positive bacteremia, a leucocytosis higher than that occurring in an uncomplicated mastoiditis, a high polynuclear count, a definite metastasis, a subicteric or icteric color and great prostration. Unfortunately, were we to wait for the appearance of even a majority of these typical symptoms, the greater number of our patients would be lost. Atypical cases appear with very great frequency, as noted by Barnhill⁷, Kopetsky⁸, Day⁹ and many others. In our own relatively limited experience of atypical cases there arose not a few perplexing diagnostic problems.

The chief difficulties preventing an early diagnosis come from the fact that the patient has not been studied with sufficient detail from the beginning.

Of the general symptoms, the temperature is

by far the most important. Instead of fluctuating from normal to the usual elevation of 104° to 106°, its maximum may not exceed 101°, as reported by Emerson¹⁰. It may even be subnormal at times. A two-hourly, twenty-four hour temperature chart in such cases will often show slight, but suggestive fluctuations pointing to recurring invasions of the blood stream. There may be more than one marked elevation of temperature per day, or it may remain normal or subnormal for two successive days, as was observed in one of our cases, that of a child of six who died of septicemia, without gross findings in the sinus.

In atypical cases the chills may be so slight as to be unobserved. Questioning the patient as to the presence of chilly sensations and palpating the extremities or patellae of a phlegmatic or apathetic individual, may disclose what would amount to a chill in a more sensitive patient. Sweating may occur without the preceding chill, and may not be noticed.

The pulse is proportional to the temperature, unless it is affected by irritation of the vagus, or by a brain complication.

The gastrointestinal symptoms are those usually accompanying a septic fever. Vomiting without relation to food intake occurs in many cases.

Vertigo is rare, and is to be referred to labyrinthine or cerebellar irritation. In the case of a young man under our care the vertigo was so severe as to suggest a serous labyrinthitis for several days until metastases appeared on the sixth day after the onset of his ear symptoms.

The sensorium is usually unaffected until very late in the disease.

Metastatic lesions, after other foci have been excluded, are almost a conclusive proof a pyemia from the sinus or mastoid. They occur most frequently in the lungs in the form of lung abscess or pneumonia. In one of our cases the presence of a severe central pneumonia obscured the diagnosis. In every case of pneumonia associated with a suppurating ear or mastoiditis, one should think of the possibility of it being of metastatic origin. The number of cases of pneumonia occurring in the course of acute ear diseases is at least suggestive.

Metastases in the subcutaneous tissue or muscles are frequent, and do not always break down. They may even be so painless as to be overlooked, as pointed out by Leegaard¹¹. With less frequency, metastases occur in other parts of the body.

Of the local symptoms, pain is the most characteristic and most constant. This, however, varies greatly. Attention cannot be called too emphatically to the fact that there may be an absence of local pain, particularly in those cases of latent mastoiditis, which not infrequently occur, with complete absence of both pain and fever. In such cases a functional test of the hearing and an otoscopic examination will often reveal an otitis which has escaped notice. Here the roentgenogram may be of special help in revealing alterations within the mastoid. Persistent pain following the simple mastoid operation, especially if accompanied by fever of the intermittent type, points to sinus thrombosis.

Pain or tenderness on pressure in the region of the mastoid emissary vein (Riesenger's symptom) indicates a perisinus abscess or sinus thrombosis.

Headache, when unilateral and on the side corresponding to a suppurating ear, is suggestive of any endocranial complication, including sinus phlebitis.

Pain or tenderness in the posterior triangle of the neck indicates the probable extension of a phlebitis into the anterior condylar vein.

If the pain in the mastoid region is severe and persistent, it is probably the result of a secondary localized serous meningitis.

Only as the result of an extension of the infection into the cranial cavity do we get symptoms on the part of the cranial nerves, the abducens being most often affected.

Involvement of the wall of the internal jugular vein manifests itself in swelling and rigidity of the neck from infection of the neighboring lymph glands. This is usually a late symptom.

Gerhardt's sign, consisting in an unequal filling of the veins of the two sides of the neck, is occasionally present.

Changes in the optic disc are present on the affected side in a number of cases, different writers giving from twelve to fifty per cent as the frequency of positive intra-ocular findings in cases of sinus thrombosis. Ophthalmoscopic examination showed definite alterations of the disc in one-third of our cases. As a help in determining which of the two sides is the seat of the sinus thrombosis, in cases of double mastoiditis, the presence of an optic neuritis on one side would be of great assistance.

One may be at a loss in diagnosing a sinus thrombosis from the local findings even after exposure of the sinus, for its appearance is often no criterion as to whether or not it contains a thrombus. Two of our cases, one dying of pneumonia, the other being in a highly septic condition when first seen, showed only healthy bone overlying the sinus, the sinus wall in each case appearing normal. Perisinus abscess, even with great thickening of the sinus wall, but without pyemia, is a common finding in acute mastoiditis.

Our chief aid in making an early diagnosis, especially in atypical cases, is the blood culture¹². One or two negative blood cultures signify nothing. A positive bacteremia, however, after excluding such conditions as an acute tonsillitis, erysipelas, septic endocarditis and other infections which might produce bacteremia, is almost indisputable proof of the existence of otogenous pyemia, when there is present a mastoiditis or middle ear suppuration.

Diagnostic puncture of the sinus, according to Dench¹³ and others, is dangerous and unreliable. It is justifiable when, with a bilateral mastoiditis, it becomes necessary to determine which is the affected side, the culture showing the greater number of colonies per given volume of blood indicating the sinus to be operated.

In the beginning stages it may be necessary to differentiate a pyemia of otitic origin from peritonissillar abscess, a severe pneumonia, malaria, typhoid fever, erysipelas, acute digestive disturbances in children, and the initial stages of the acute infective diseases, all of which may show a bacteremia.

Prognosis: Mortality from pyemia of otogenous origin in the pre-operative era was upwards of ninety per cent. This mortality has not changed for those patients whose medical attendants still live in the pre-operative age. The chances of recovery are directly proportional to the timeliness of adequate surgical intervention. Alexander¹⁴, in a series of ninety-six cases, reports a post-operative mortality of only sixteen per cent. This figure is identical with results reported by Crockett¹⁵ from the records of the Massachusetts Charitable Eye and Ear Infirmary.

Treatment: The treatment of an otogenous septicemia is entirely surgical. Prophylactic treatment consists in the prompt performance of the simple mastoid operation in all acute cases of mastoiditis, and of the radical mastoid operation

in chronic cases, when operative interference, according to modern otological teaching, is at all indicated.

These procedures undoubtedly are effective at times in aborting a sinus thrombosis when in the earliest stages of its development. Later, a positive clinical and laboratory diagnosis of pyemia having been made, conservative surgery has no place in the treatment of this dangerous disease, notwithstanding the fact that much seductive literature has been written favoring a conservative plan of procedure. The further entrance into the circulation of septic material from the focus in the mastoid should at once be prevented by ligating the internal jugular vein. The lateral sinus must then be thoroughly cleared of septic material, its outer wall resected and the cavity allowed to drain, hemorrhage from the sinus being prevented by proper surgical technic. The simple ligation of the jugular, according to Tobey¹⁶, at the point of election above the facial vein is sufficient in most cases when there is no involvement of the vein itself. When it is invaded by the infective phlebitis, it should be resected¹⁷, with ligation of any of its tributaries which may be involved.

In severe cases, with a persistence of pyemic symptoms after operation on the sinus, marked improvement has been noted following blood transfusion. This was very noticeably true in one of our cases, that of the young man with the hemorrhagic type of mastoiditis already mentioned, who had multiple abscesses in the subcutaneous tissue.

In many cases of pyemia of otogenous origin with complications such as pneumonia, cardiac lesions, or nephritis, adequate treatment has doubtless been withheld because of the fear that the patient could not withstand a general anesthetic. Under such circumstances we have employed a local anesthetic with very satisfactory results.

CONCLUSIONS

1. Pyemia having its origin in suppuration of the middle ear is more frequent than we have been accustomed to believe.

2. The best results in combating it can be attained only through early diagnosis, and prompt and thorough surgical intervention. The former demands unusual vigilance and painstaking care on the part of the family physician, who generally is the first to attend cases of ear diseases and their complications.

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DISCUSSION

DR. WILLIAM R. MURRAY, Minneapolis: Attention has been called in the paper presented to the importance of the early recognition of lateral and sigmoid sinus thrombosis, and I merely wish to emphasize one point, namely, the importance of recognizing, at an early stage, pathological changes in the lateral or sigmoid sinus or the jugular bulb when they occur in connection with middle ear infection, or a mastoid infection, or in a case in which there has been recently a middle ear or mastoid infection. When definite symptoms and signs of involvement of the blood

stream in a case which has middle ear or mastoid infection are present, it is very important to recognize the probability of a sinus infection, and the sinuses should be investigated, because a favorable prognosis in sinus infection is inversely proportionate to the duration of the infected thrombus. If an infected clot is present in the jugular bulb, lateral or sigmoid sinus, and that infected clot is allowed to remain and is not surgically drained, the prognosis is exceedingly grave. If an infectious clot is forming in the sinuses, or if it has already formed, but has not reached the late stage and is not discharging septic material into the circulation, operative interference gives a very favorable prognosis. At least, in the early stages, the prognosis is favorable. In the latter stages the prognosis is correspondingly graver.

The method of investigating the sinus is of some importance. It is not sufficient to simply uncover the sinus, and note the appearance of the sinus wall, because we may have extensive changes in the external surface of the sinus wall, and yet there may be no thrombus present. It is misleading to attempt to palpate the lateral sinus with a view to determining whether or not there is present a clot. There may not be a clot present, and yet the sinus may be fairly firm, or, on the other hand, there may be a clot present and we are not able to say by palpation whether or not there is a clot present. If the signs indicate that there is present a sinus infection, the sinus should be opened, then we can determine whether or not there is any infection there, or whether a clot has formed. If a clot has formed within the sinus, if there is an infected thrombus there, the jugular vein should be ligated and the sinus thrombus should be cleared out. Whether or not ligation should be done in preference to excision will depend upon the extent of the thrombus. If the latter extends into the jugular vein, it may be necessary to excise. If it has not extended down into the jugular vein it is unnecessary to excise, but the vein should be ligated above the facial, and this simple operation should not be

attended with very much shock, whereas an excision of the jugular vein is a more prolonged operation and attended by considerable shock, and the results are not better, provided a clot has not formed in the jugular vein.

The symptomatology has been covered by the essayist, but I would simply say that the principal signs and symptoms will be a fluctuating temperature, and bacteremia. The other signs and symptoms mentioned in connection with sinus thrombosis are variable. Some of them are present, but very often they are absent.

DR. L. W. MORSMAN, Hibbing: In the first part of his paper, Dr. Newhart brings out the point that oftentimes we do not have symptoms in lateral sinus thrombosis. I wish to report a case I now have in the hospital. The patient is a woman, 50 years of age, on whom I have been hesitating to operate on account of her general physical condition. She had a subperiosteal abscess formed from a furuncle, secondary to a chronic otitis media. I now determined to operate. Her temperature and pulse were always normal. There were no symptoms of sinus thrombosis manifested in any way; yet we found a complete necrotic mastoid with a thrombosis extending about three centimeters. A complete exenteration was performed with removal of thrombus. She recovered nicely from the operation; her temperature never went above normal. The case is an illustration of a patient manifesting no symptoms whatsoever, and yet we had that very marked pathological condition present.

DR. HORACE NEWHART, Minneapolis (closing): I wish to emphasize one point, for which there was no time in the reading of the paper, and that is, that even in late cases with complications and which present a very unfavorable prognosis, we should have the courage to do everything possible to remove the primary focus and to prevent further invasion of the blood stream, employing a local anesthetic, when a general anesthetic is contraindicated.

STUDIES ON THE RESPIRATORY ORGANS IN HEALTH AND DISEASE

V. A COMPARISON OF LUNG CAPACITY READINGS AND PHYSICAL SIGNS IN PULMONARY TUBERCULOSIS*

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As early as 1846 Hutchinson made a comparison of vital capacity readings and stage of disease in pulmonary tuberculosis. He found the vital capacity reduced from 3,670 to 2,441 cubic centimeters in the early stage and from 3,605 to 1,360 cubic centimeters in the advanced stage of the disease. Arnold in 1855 made a similar study and arrived at conclusions which were not unlike those of Hutchinson.

Recently Dreyer and Burrell (1920) made a report of the results of observation on 200 tuberculous individuals in whom they found the lung capacity test a valuable aid in the classification of cases.

Wittich, Meyers and Jennings (1920) reported findings on a series of 80 tuberculous cases.

OBSERVATIONS

This study includes observations on 230 men and women of whom more than 200 were frank cases of tuberculosis. Nearly all the physical examinations were made by two lung specialists who classified the patients into the various stages of the disease before it was known that the lung capacity test would be taken. The vital capacity and other necessary measurements were taken and the physical fitness percentage was computed in each case by an individual who had no knowledge of the physical findings and the stage into which the patient had been placed. A comparison was then made of the physical signs and vital capacity readings and the curves were plotted, and the tables made from the original examinations and observations.

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The lung capacity readings were all taken with the water spirometer. The age, standing height (without shoes) sitting height, chest circumference and net weight were then recorded and the physical fitness percentages calculated from these measurements.

The theoretical normal lung capacity was taken from Dreyer's tablets in which the calculations were made from the trunk length and chest circumference. From this normal lung capacity and the observed lung capacity the physical fitness percentage was computed. In many cases, however, the percentage seemed high for the extent of involvement revealed by the physical examination. Therefore other methods were used as follows: The normal body weight of each individual was ascertained from the Weight Tables of the Prudential Life Insurance Company. Using this weight, the theoretical normal lung capacity was computed from the formula:

$$\frac{Wt^{0.72}}{0.69} = V. C. \text{ for men. } \frac{Wt^{0.72}}{0.85} = V. C. \text{ for women.}$$

In the last method, the surface area of the patient was divided into the observed lung capacity. This gave the number of liters of air exhaled per square meter of body surface. From this number and the known normal the percentage was easily calculated. The percentages obtained from the three methods were averaged and the mean percentage was allowed to represent the physical fitness of the patient. It is interesting to note that the percentages obtained from the use of Dreyer's tablets were usually somewhat higher than those obtained by the two other methods.

I have taken vital capacity readings on some 350 tuberculous individuals and have observed no harmful effect to any patient. Other observers have reported that their patients apparently received no injury from the lung capacity test.

The patients were grouped as follows: (1) Suspected cases (a) no physical signs, (b) indefinite physical signs; (2) definitely tuberculous cases, (a) minimal stage, (b) moderately advanced stage, (c) far advanced stage.

Table I shows that in Group I there are 21 cases with no physical signs. The average physical fitness percentage for the group is 98. The highest physical fitness percentage is 122 while the lowest is 80. In Group I there are also 7 cases whose physical signs are indefinite. The average physi-

cal fitness percentage for this series is 93. The highest physical fitness percentage is 125 while the lowest is 74.

TABLE I

GROUP I Suspected Cases	Number of Cases	Average Physical Fitness (per cent)	Highest Physical Fitness (per cent)	Lowest Physical Fitness (per cent)
(a) No. physical signs	21	98	122	80
(b) Indefinite physical signs.....	7	93	125	74
GROUP II				
Definitely				
Tuberculous				
Cases				
(a) Signs of minimal disease	45	90	126	64
(b) Signs of moderately advanced disease...	87	70	112	26
(c) Signs of far advanced disease...	70	49	86	26

In Group II we find 45 cases whose physical signs reveal evidence of minimal disease. The average physical fitness percentage for this series is 90, while the range of physical fitness is from 64 to 126 per cent. In 87 cases the physical signs revealed evidence of moderately advanced disease. The average physical fitness percentage of the series is 70. The highest and lowest physical fitness percentages are 112 and 26 respectively. There are 70 cases in Group II whose physical signs reveal evidence of far advanced disease. The average physical fitness percentage of these cases is 49. The range of physical fitness is between 26 and 86 per cent.

Percentage frequency curves Fig. (1) were constructed in an attempt to more easily visualize the results of the work. A glance at these curves shows that in a general way the physical fitness of the patients decreases as the physical signs increase. In plotting these curves the suspected cases who had indefinite signs were grouped with those who had no physical signs. The curve shows that there are only 3 per cent of the cases with a physical fitness between 70 and 80 per cent. Approximately 21 per cent of the cases have a physical fitness between 80 and 90 per cent. The mode of this curve is formed by 27 per cent of the cases whose physical fitness percentage is between 90 and 100. Between the physical fitness percentages of 100 and 110, 110

and 120, and 120 and 130 are found 24, 13, and 2 per cent of the cases respectively.

It will be seen that approximately 4 per cent of the cases whose physical signs reveal evidence of minimal disease have a physical fitness between 60 and 70 per cent. There are approximately 17 per cent of the cases in this series whose physical fitness percentage is between 70 and 80. The mode of this curve is formed by 35 per cent of the cases whose physical fitness is between 80 and 90 per cent. There are 17 and 15 per cent of the cases of this series whose physical fitness percentage is between 90 and 100, and 100 and 110 respectively. From here the percentage of cases rapidly decreases until only approximately 2 per cent show a physical fitness between 120 and 130 per cent.

The patients whose physical signs reveal evidence of moderately advanced disease show the greatest variation in physical fitness of any series in either group. It will be observed that 3 per cent of the cases in this series have a physical fitness between 20 and 30 per cent. There are no cases which show a physical fitness between 30 and 40 per cent. Seven per cent, however, have a physical fitness between 40 and 50 per cent. From here the number of cases increases until the mode is formed by those whose physical fitness is between 60 and 70 per cent. The number of cases whose physical fitness is between 70 and 80, 80 and 90, 90 and 100, and 100 and 110 per cent gradually decreases until only 1 per cent show a physical fitness between 110 and 120 per cent.

In the series of cases whose physical signs show evidence of far advanced disease there is only 1 per cent with a physical fitness of 20 to 30 per cent. The mode of the curve is formed, however, by 28 per cent of the cases of this series whose physical fitness is 30 to 40 per cent. A glance at the curve shows that the majority of cases in this series have a physical fitness below 60 per cent. However, nearly 3 per cent of the cases are between 80 and 90 per cent physically fit.

DISCUSSION

We know there is a great deal of individual variation in lung capacity depending somewhat upon such factors as occupation and past physical training. It is not uncommon to find an individual indulging extensively in athletics with a lung capacity of 120 per cent or more. Furthermore it is possible for an individual whose lung capacity is 100 per cent to increase that capacity somewhat

by special training. On the other hand one occasionally sees a person leading a sedentary life whose lung capacity is reduced to 90 per cent. Yet thorough examinations reveal no lesions of any clinical significance in the lungs or heart. If the lung capacity or physical fitness of an individual is reduced much more than 10 per cent one becomes suspicious of existing disease either in the lungs or heart; however, such factors as obesity and old age may some times account for such reductions. It was pointed out in a previous paper (Myers 1921) that an individual with an over-developed lung capacity (for example 120 per cent) may develop definite disease and have a lung capacity reduced 30 per cent and still appear to be within normal limits. Therefore, the examiner should always be on his guard when a patient with questionable or even definite physical signs proves to have a physical fitness of 100 per cent or more. A very detailed inquiry should be made into the past physical training and experience of such an individual. Every known test and examination of any clinical value should be given, and in the final analysis of such a case one must be very cautious not to place too much emphasis upon the fact that the lung capacity is 100 per cent for this may be apparent rather than real for this individual. In this type of case a safe diagnosis is often extremely difficult. In such cases one may be greatly aided and relieved by being able to obtain from such sources as a college or university or an industrial institution the actual lung capacity of a given individual recorded months or years before and at a time when he was in good health.

In the group of patients with indefinite or no physical signs of pulmonary tuberculosis a few showed physical fitness percentages as low as 70 to 80. One may be quite sure that in patients who fall this low there is disease of clinical significance although the physical signs may not definitely reveal it. Although the majority of cases in this group showed a physical fitness well within the above normal limits, they were very carefully observed over a period of several weeks. Most of them were found to have a tuberculous infection but no tuberculous disease.

In the series of cases whose physical signs showed evidence of minimal disease there are a few whose physical fitness was reduced to between 60 and 70 per cent of the normal. One case is rather striking in that the physical signs were very slight on first examination and the x-ray examination revealed

evidence of a very small area of infiltration in the first interspace on one side. Nevertheless this patient, although the symptoms were not marked, had a physical fitness reduced to 64 per cent of the normal. In such cases the physical fitness test gives much more information as to the toxicity and severity of the lesion than do the physical signs. Garvin, Lundsgaard and Van Slyke pointed out that in such cases reduced lung capacity is due to an increased amount of residual air and not to actual destruction of lung tissue.

It is interesting to note that many of the cases in this series showing signs of minimal disease have a physical fitness percentage which is quite or even above normal. This may be explained in two ways. First, some of these individuals may have had a much overdeveloped lung capacity when in good health and the physical fitness although apparently normal may in reality be considerably reduced. Second, since the physical signs give us information as to what has occurred in the lungs in the past and little or no information as regards present activity it is possible that many of these cases have old tuberculosis which at present is insignificant clinically. For example, a young man recently came in for an examination of the lungs. He was 6 feet tall and weighed 195 pounds. Physical examination of his chest revealed impaired resonance on the right side to the third rib, bronchovesicular breathing, type II to the second rib; vocal resonance and whispered voice were definitely increased to the second rib. Râles were numerous after enough to the second rib. The x-ray examination revealed a definite Dunham's cone in the right upper lobe. This patient did not have one of the cardinal symptoms of pulmonary tuberculosis and his physical fitness was found to be more than 100 per cent. After his examination was completed he handed me one letter from Dr. Cabot of Boston and another from the Rutland Sanatorium (Mass.) in which were listed the physical signs and x-ray findings four and five years ago respectively. It is interesting to note that practically no change had occurred in his physical signs and x-ray findings to the present time, yet this individual is working every day and has done so for the past three years.

We find a very small number of cases with signs of moderately advanced disease with a physical fitness percentage as low as the lowest cases whose physical signs reveal far advanced disease. In such cases there is a possibility that the examiner was

liberal with his classification or since a few weeks sometimes elapsed between the physical examination and the taking of the lung capacity it is possible that the disease progressed rapidly into the far advanced stage. It seems more probable, however, that such cases have lesions of a very severe nature which reduce their physical fitness as much or more than much more extensive lesions of a mild nature. On the other hand 16 per cent of the cases who had signs of moderately advanced disease showed a physical fitness within or above normal limits. The statements made regarding cases with signs of minimal disease whose physical fitness is within or above normal limits also apply in similar cases who have signs of moderately advanced disease.

The majority of cases of the series whose physical signs reveal evidence of far advanced disease have a physical fitness below 60 per cent, however, there are a few as high as 80 to 90 per cent. It is not uncommon to find individuals with numerous râles over both lungs and other physical signs of far advanced disease who are working every day.

A glance at the frequency curves (Fig. 1) shows that the results obtained from the assessment of an individual's physical fitness through lung capacity, surface, area, weight, stem length and chest circumference aids greatly in the diagnosis of pulmonary tuberculosis of clinical significance. The curves also show, however, that the lung capacity test is not infallible, for a considerable number of cases with physical signs of minimal and even moderately advanced disease have a physical fitness within or above normal limits.

The lung capacity test is more valuable than the physical signs in ascertaining the severity of the disease, as one patient may have very extensive physical signs and yet have a physical fitness which closely approaches the normal limits while another patient with very slight signs may have a physical fitness reduced to 60 per cent of the normal.

Subsequent lung capacity tests are very valuable in studying the effects of treatment of the disease, as they often register changes in the functions of the lungs before the physical signs change. One of the cases in the series showing signs of minimal disease had a physical fitness of 64 per cent when sent to the sanatorium. After four months' treatment this patient's physical fitness was found to be nearly 90 per cent. In the case of a medical student whose physical fitness was much reduced before treatment was begun, it was found that at the end of six

months of postural rest at home her weight had increased from 110 to 150 pounds and her physical fitness had increased to nearly 85 per cent. On the other hand cases who do poorly on treatment show a stationary or decreasing physical fitness.

It is unsafe to give too much value to the lung capacity test in rendering a prognosis when a case is seen for the first time. For example, the lung capacity may be reduced 15 or 20 per cent, yet the lesion may be of a very progressive nature and cause an extremely rapid decline of the patient. Again the lung capacity may be very low but the patient may be of the type that responds quickly and surely to the treatment. Subsequent lung capacity readings become of great value, however, in rendering a prognosis.

The physical signs are indicative of what has occurred in the lungs in the past and they give us very little information as regards present activity of a tuberculous lesion. The lung capacity test tells us to what extent the lungs are able to function. After all, the functioning power of the lungs is of paramount importance. It matters little how extensive the physical signs are as long as compensation is developed and maintained sufficiently to insure the individual a reasonable physical fitness percentage. The lung capacity test is the best method of quickly ascertaining the degree of compensation established.

I am deeply indebted to Dr. E. S. Mariette, Dr. F. L. Jennings and Dr. H. A. Bendes, of the Glen Lake Sanatorium, and to Dr. W. J. Marcle, of the Hopewell Sanatorium and Thomas Hospital, for their valuable aid in the accumulation of the data used in this paper.

I wish to express my indebtedness, also, to Professor R. E. Scammon for valuable suggestions and aid in plotting the percentage frequency curves here presented.

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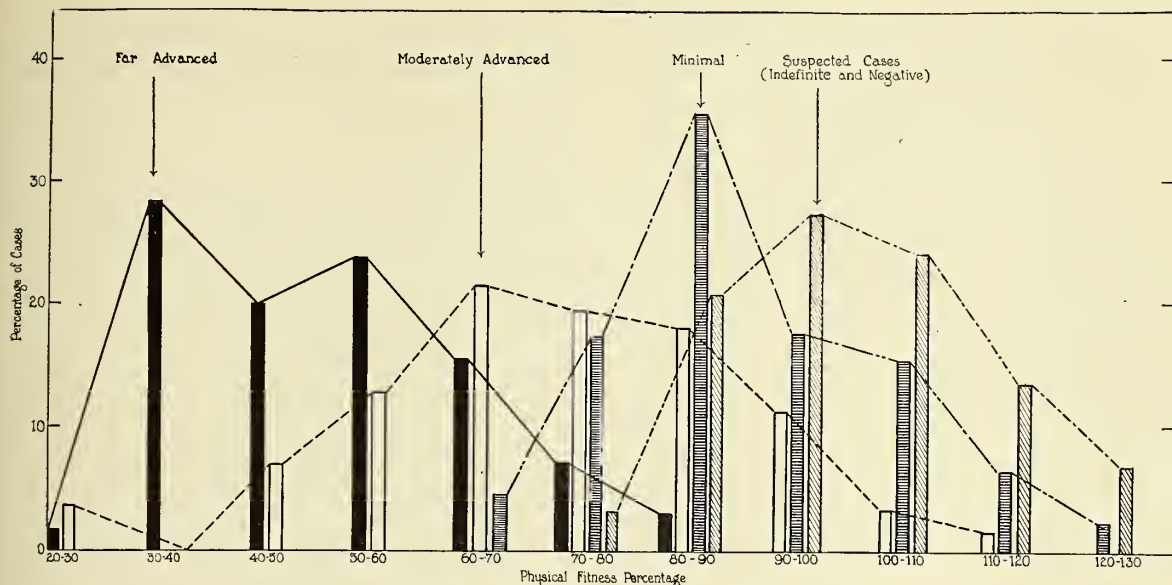


Fig. 1

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DISCUSSION

DR. S. MARX WHITE, Minneapolis: I think the section is to be congratulated on having presented before it a paper of the value that Dr. Myers' paper has. It is a real contribution to our knowledge of a subject that is arousing very decided interest and considerable study at the present time, as is shown by the equally valuable contribution of Drs. Ulrich and Nathanson on what might be termed an allied topic.

Upon a consideration of what enters into this vital capacity it is evident at once that we are not speaking of the mechanical reduction in the amount of lung tissue which is functioning, but that we have certain other factors such as were brought out in the other paper. Prob-

ably a decreased elasticity of the alveolar wall is present and that factor probably pertains in as definite a sense in this field as it does in the other, because in tuberculosis we are dealing usually, in an active case, with toxic factors as much, or often more, than we are with mechanical factors and we are aware that tuberculosis as an infection has effects upon the myocardium and upon the musculature, and the vital capacity is determined to a certain extent by the part the myocardium plays and the pulmonary circulation, and involves also, to a certain extent at least, the tonus and capacity of the skeletal musculature. So it is evident that in this study of the vital capacity we are dealing not with a single element, but with the changes in the heart or skeletal musculature, and Dr. Myers has very well brought out the part which the physical history of that patient plays. We cannot take the figures as absolute as Dr. Myers has pointed out; one individual will have a vital capacity considerably beyond the normal and an infection may reduce this considerably and yet the figures remain more than the normal.

A point that should receive particular attention at this moment is the contention that we are dealing not with a test that will give us a diagnosis of pulmonary tuberculosis, but we are dealing with a test that will give us some index not of the tuberculosis but of the vital capacity of that patient. We should be careful to limit ourselves to that. With so many of the tests which are new we are apt to examine the test and think it gives us specific information. It does give us specific information, but as to the vital capacity and it should be limited to that field. One of my pet hobbies is that we should not limit ourselves to narrow studies, but that we must take into consideration the history of the patient, another factor which is of very great value and I believe will be of value in connection with this test.

In conclusion I wish to compliment the Hennepin County Tuberculosis Association, and call your attention to the fact that this work is being done by a group of men in that county, showing us how this work can be done in good fellowship and how we can work together in this way.

HEALTH OF SCHOOL CHILDREN*

B. C. BERNARD
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It is noted that the theme of this program is "Training for Service." You, as educators, hold the future of America within the hollow of your hand. The principles and ideals that are inculcated in the minds under your care, may sway the policies of future generations. In this matter of training, you rank second only to the parent. Yours is indeed a grave responsibility. As I look back over my own training, I must admit that for some of my teachers I still have the most profound respect and admiration. Some of the doctrines imparted to me while under their care, have remained through the passing years.

Lest we be carried away with modern methods of cramming a child's head with knowledge, we should also keep an ever watchful eye on their bodies. A trained mind overflowing with valuable information is certainly much handicapped by an unhealthy body. "What shall it profit a child if he gain the whole curriculum and lose his health?" Although some of the great minds of the past, in spite of diseased bodies, have contributed much to the literature and progress of the present generation, it behooves us as public servants to see that children develop strong bodies as well as strong minds.

Among school children there will be found some who are almost perfect physically. What methods may be employed to bring the remaining large percentage up to the normal standard? The ideal plan would be to employ a school physician, one who is a real doctor and one who loves children. The school physician should be assisted in his work by one or more trained nurses. Regular, systematic examinations will certainly aid in finding many children below par physically. The teachers and nurses, seeing the children oftener than the physician, can aid by noting any defects and bringing them to the doctor's attention.

Scarlet fever and diphtheria are deadly diseases. By quick quarantine, their spread can be prevented. In the latter, the anti-toxin promptly administered, will greatly reduce an otherwise high mortality. By the use of the Schick test, children who will easily take diphtheria, can be detected; and pro-

tective immunization measures can be begun. Reports from New York City, where much work along this line has been done, are very encouraging.

Measles and whooping cough in themselves alone, are not very dangerous diseases. However, the mortality following these two diseases on account of their serious complications and sequelæ is very high. Quarantine should be instituted at once. The writer can well remember hearing parents and even doctors say there was no use in trying to prevent children from having measles and whooping cough; and also, the sooner they had these diseases and recovered, the better. Modern preventive medicine has far higher standards.

Ninety-seven per cent of the school children in this country have defective teeth. Remember that "mouth health aids body health." A bad tooth is either too bad to keep or good enough to save; every defective tooth in a child's mouth will come under one of these two heads. Dental inspection should be made regularly and instruction given in oral hygiene.

It has been customary within the past few years, whenever we find an undernourished or underdeveloped child, to think of the tonsils or adenoids as a possible cause. These organs should be removed only when they cause trouble or when they have caused several illnesses. An enlarged tonsil does not necessarily mean disease, past or present.

As a student of tuberculosis, as one who daily sees the dying consumptive, I cannot refrain from this opportunity to stress a disease causing a frightful toll of human life. Tuberculosis gathers its victims from the cradle to a ripe old age. No period of man's life is exempt from its ravages. H. J. Achard,* in speaking of "The Child with Latent Tuberculosis," says, "Severe epidemics, such as those of smallpox, slew their thousands quickly and people became alarmed and demanded that the Government should do something about it. Tuberculosis is slow, insidious; yet it slays its millions. Nevertheless the people fold their hands and bow to the Will of God, which is their own inertia, their own unwillingness to bestir themselves."

In homes housing the consumptive, we so often see poorly developed and undernourished children, frequently with enlarged glands, especially in the neck. This generally means that the children have

*Read before Northwest Central Minnesota Educational Association, Moorhead, Minnesota, October 14, 1921.

*H. J. Achard: American Review Tuberculosis, 1921, 405.

been infected with tuberculosis and unless great care is used, they will lose their lives from a preventable disease. The source of infection should be removed at once. This, of course, means the consumptive should be sent to a sanatorium where he will be given the best care and treatment and where he will be taught the principles of hygiene, which, if followed, will minimize the danger of his spreading the disease.

It is not always possible to send the open case of tuberculosis to a sanatorium. This home should then be put on the list of the visiting nurse, who will see to it that preventive measures are used.

What can be done for the children of this home, those presenting the slightest signs of a weakened, "run-down" condition? Day camps and open air schools have proved their usefulness and have helped to solve the problem of the tuberculous and pretuberculous child. For those with manifest tuberculosis it is advisable to employ sanatorium treatment. Results have been very encouraging. However, there are some for whom no provision can be made outside the home. The latter should be placed under the care of a competent physician and should be given plenty of good nutritious food, fresh air and sunshine, with regular hours and sufficient rest.

When a child is kept up to the standard physically, he is much less prone to be attacked by disease; and if he should be stricken his chances of recovery are much greater than the child who is

already "run down." We have all heard some fond mother speak of her child, "Johnny is never very strong. He always takes everything." The National Tuberculosis Association, with thought both for the citizens of the present and the future, has adopted a plan whereby weak children may be improved and the strong kept strong. Under the guidance of this organization, The Modern Health Crusade was formed. Under the direction of their teachers children are taught cleanliness, regular hours, etc., the latter are called health chores and pupils performing these duties satisfactorily are dubbed knights, squires, etc.—the higher rank denoting greater proficiency.

The children are given buttons which indicate the rank they hold in this organization. Under the direction of the teacher, health pageants are shown. These help to educate the general public in matters of right living and instill into the child's mind some of the means and the importance of safeguarding health.

In large cities health problems of schools can be thrown on the shoulders of physicians and nurses. In rural communities, this cannot be done. The teacher must frequently assume the responsibilities of the nurse and occasionally that of the physician. The teacher must train himself to look for any eruption on the exposed portions of the body, the wan, tired look in the eyes, the sallow cheeks and poor development—all probably denoting some form of disease.

MENTAL HYGIENE AND THE GENERAL PRACTITIONER*

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Mental Hygiene is the science of the promotion and preservation of mental health. It is that branch of public health and preventive medicine which concerns itself with nervous and mental ailments, as well as with the function of making normal minds more efficient. After briefly outlining the principles, aim, and scope of Mental Hygiene I propose to dwell on the place the practicing physician should take with respect to this large and important subject.

Endeavors in the field of Mental Hygiene may be classified as *individual*, *institutional*, and *communal*. There is nothing new or even recent in the first class. The practicing physician has almost daily occasion to do something toward promoting a patient's mental health. Efforts of clergymen, teachers, welfare workers, and others in many respects come under this class.

The care given by state hospitals for the insane, for the feeble-minded, epileptic, and inebriates constitutes largely the activity in the second class. It is less than a century ago that the mentally diseased were first treated as sick people, and less than half a century ago that mental defects began to be housed in special institutions devoted to their care. According to statistics compiled by Pollock and Furbush there were confined in the state, county, municipal, federal, and private hospitals 232,680 insane in our country on January 1, 1920. The proportion of mental cases hospitalized varies in the different states. In New York State, where the highest rate of hospitalization obtains, and where institutional care has been most highly developed, one out of every 267 inhabitants is cared for as mentally disabled under an entire institutional regime. In Arkansas, where the proportion is but one to 1,205, over 30,000 mental cases are admitted to state hospitals annually. On January 1, 1920, 40,519 mental defectives were housed in institutions. Dr. Walter E. Fernald estimates that this represents only about 10 per cent of all

the existing cases. Army examinations resulted in the rejection of 3.7 out of every 1,000 cases examined for mental defects. At the beginning of last year 14,937 epileptics were taken care of in special institutions.

Communal endeavors, along organized lines, on the other hand, have had their origin very recently. The first organization in Mental Hygiene in the world began in 1908, when the State society was formed in Connecticut. In 1910 a National Committee for Mental Hygiene was organized, and, by 1920, a little over one-third of the states of the Union had formed Mental Hygiene Societies. Minnesota was not then, nor is now, among these.

The organization of special out-patient clinics, and of neuro-psychiatric social service, survey of correctional institutions, and of school children, disseminating knowledge to the public regarding mental disease or mental defect, are attainments of organized Mental Hygiene, and are a part of the communal program.

Combining individual, institutional, and communal endeavors for definite constructive achievements in (a) conserving and promoting mental health and making sound minds more efficient; (b) in determining causes, the essential nature, and the most suitable modern relief measures instituted early under the direction of the family physician; (c) providing ample hospital and institutional facilities for the care of cases requiring this form of treatment, as well as the organizing of out-patient clinics, satisfactory after-care, and an adequate social service; (d) fostering community organizations to assist in the supervision and care in the homes of the mentally defective; (e) segregating mentally defective and mentally delinquent school children and organizing separate classes, and providing for them special medical and psychometric examinations; (f) safe-guarding against the unlimited reproduction of mental defectives; (g) spreading throughout communities information about prevention and early care of mental disease, and the necessity for supervision of mental defects; (h) co-ordinating public and private agencies: these, in brief, outline the aim and scope of a Mental Hygiene program.

Let us turn to the situation of the neuro-psychiatric ex-service man. The number of mentally disabled soldiers was so great that the Federal agencies encountered a difficult problem. Only a small percentage of these cases were transferred from

*Presented before the Minnesota State Medical Association, Duluth, Minn., August, 1921.

the army to civilian hospitals or Public Health Service hospitals. As time went on, after the armistice, recurrences and new cases developed at a rapidly increasing rate, and the Government was naturally called upon to care for these. To establish contact with the patients and their families was a procedure which required a vast field organization. Neuro-Psychiatric Sections were formed in the District Supervisor's offices of the United States Public Health Service. Happily the Red Cross Social Service agencies reached out by virtue of its organization, highly developed during the war, into nearly every community. Furthermore, it was necessary to establish co-operation with existing state and other local agencies, which has greatly assisted in this work.

Many situations developed which were entirely new to the families concerned. There would be reported an ex-service man in jail, who was said to have suffered from mental disease; another ex-service man would sleep in a straw-pile because he feared people; another became very troublesome in his home, and refused any and all hospital treatment; still another was forging checks and committing thievery; the family could do nothing with him—what was there to be done? There was the man who attempted murder, and who was a paranoiac; he was in jail, the judge requesting attention by the Federal Bureau; then there was the not uncommon man who continually threatened suicide, but whose parents refused to allow him to be taken away from them—these are but a few of the difficulties that had to be met, promptly and effectively. Fortunately the American Red Cross trained neuro-psychiatric social workers. These, understanding social problems in mental disease, established contact with the families. In the larger cities families were visited; discharged mental cases were followed up by home visits; endeavor was made to give intelligent advice from time to time to these men who have unusual difficulties in making their adjustments. *Neuro-psychiatric problems with the ex-service men, however, do not differ essentially from those that exist among the civilian population.*

The sphere of the old-time practicing physician in his community was a broader one than exists at the present time. There has developed among the laity special interest in health problems. The state has assumed responsibility and seeks to give service which the physician formerly gave individ-

ually. The mental case, the feeble-minded, the boy or girl with tendencies to abnormal conduct, or the criminal, must be treated not only from the standpoint of individual care, but the physician must take into account the welfare of the family and the community, and have the interests of the latter thoroughly at heart. His part in Mental Hygiene concerns itself principally with the 90 per cent of the feeble-minded not in institutions; with the borderline mental case; and with the early mental case. It is not widely realized that abnormality in conduct and emotion are subject to natural causes, much as are the aberrant intellectual processes. The latter easily arouse suspicion of insanity or mental defect while, for instance, a criminal is not often thought of as being delinquent; yet, according to investigation, probably half of our criminals and prostitutes might correctly be put under such classification. Other forms of social inefficiency and maladjustments can also be placed in the same category. In the asylums, jails, and almshouses we find the complete failures. The practicing physician should thoroughly familiarize himself with preventive measures, and the most suitable treatment of early mental cases. He should appreciate that the family concerned undergoes severe perplexities. He will counsel the family with tact. To bring about isolation, hospitalization, and necessary medical care oftentimes requires great effort; to allay unnecessary anxieties of the patient and of the family is his supreme duty. He should thoroughly appreciate that through his advice development of severe psychosis may be prevented because it has been carefully estimated that as high as 40 per cent of all mental cases are actually preventable.

Ridiculing mental disease should, above all, be avoided. Dangerous impulses are often not understood by the kin, and the doctor must, therefore, instruct the family. The physician in the community is many times the first to notice evidences of mental deficiency. Mothers and fathers are very loath to recognize defects in their offspring, especially of a mental nature, and usually ascribe such a condition to teething, to a fall, or other trivial causes. As soon as the condition, however, is actually recognized, the situation should be thoroughly explained to the family, and it should be pointed out by the doctor that such a patient needs special supervision until grown up. The possibility of developing bad habits, such as thievery, criminality, lying, immorality, etc., must

be emphasized, and that these things may be avoided by constant training in institutions especially where some manual ability, sex segregation, and all possible social adaptability may be attained. It goes without saying that the physician should make a special effort to recognize diseases such as birth injuries, hemorrhages, epilepsy, congenital syphilis, etc., and treat them early in order that avoidable retardation of mental development may be obviated.

During the past few years interest in mental cases has greatly increased. *The integrated problems of Mental Hygiene are essentially medical in nature.* In working them out, the services of the teachers, of psychologists, nurses, social service workers, and others, are absolutely necessary.

It is obvious that every individual case of mental invalidity must have a physical examination, and that considerations of treatment are, first of all, medical. In stimulating greater interest in the treatment of mental disease the medical practitioner should take the leading part in his locality; to function as the chief adviser on general as well as individual mental problems will certainly aid in enhancing his position in his community. The need of a State Society for Mental Hygiene, and of a model psychopathic hospital on the University campus, and of Mental Hygiene surveys should be apparent to him; and every medical practitioner should become a member of such a proposed State Society for Mental Hygiene.

DISCUSSION

DR. W. A. JONES, Minneapolis: I quite approve of Dr. Michael's paper and cannot emphasize too strongly the necessity of developing classes of all kinds in mental hygiene. It seems to me the first class ought to start with the mothers or prospective mothers, and they should be carefully instructed in bringing up their children, both from a physical-endurance point and from a physiological method of training. Then, perhaps, we would have a lesser number, among the present generation and in future gen-

erations, of the unfit, the economically, socially, and industrially unfit. This has been borne out by the efforts of men in the service of the government who are concerned with mental hygiene among the ex-soldiers. They have met with an unprecedented number of those who are fundamentally unstable, constitutionally inferior, and wholly inadequate to the work the government called them to do. The experience of the government hospital in Minneapolis has shown what may be done and what has been done with the soldier who comes back with a mental or nervous condition that demands hospitalization, and I am very glad to congratulate the government hospital in Minneapolis on its thoroughness, its good work, and the position it occupies among other government hospitals. Here, too, of course, the same idea has been carried out. What can be done for the neuropsychiatric, unstable man; how can he best be treated, and how can he be brought back into normal conditions of life? Many of them cannot. Many of them are so crippled mentally or nervously (because they were primarily deficient) that they cannot be returned for any adequate service. Some of them may get far enough back so that they may be self-supporting, provided the government can keep its officials in touch with them and thus keep them under the influence of the mental-hygiene board. From rumors that have filtered into the atmosphere it has been impossible for the government forces to take care of all of the cases that should properly come under mental-hygiene control, but evidently the time will soon come when the government will see the advisability of establishing a number of other hospitals so that we can hope to see some benefit from headquarters in Washington.

DR. J. C. MICHAEL, Minneapolis (closing): Education should be emphasized as a cardinal feature in mental hygiene. For instance, how many cases of drug addiction could be prevented if the habit-forming nature of drugs was widely known? Certainly, most of those not due to physical and mental disease and those due in part only to such diseases could be prevented. How many people realize that offspring conceived in the debauches of alcoholism are very apt to be prone to constitutional ailments such as epilepsy, etc.? Would it not be worth while in this respect to educate? I did not try to go into great detail on this subject. I do hope that an interest in mental hygiene may be aroused among the practitioners in this state. Among the laity there are some wrong ideas on this subject and the medical men should be particularly interested in helping to educate the public in sane mental hygiene principles.

MARGINAL AND JEJUNAL ULCERS FOLLOWING GASTRO-ENTEROSTOMY*

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St. Paul, Minn.

That gastro-enterostomy, which is such a benefit to the patient in need of stomach surgery, should be followed by ulcers at the site of the anastomosis or near by, gives one, on first thought, the impression that one should be very reluctant to advise this operation. However, when we make an analysis of what really happens and in what percentage of cases this unwelcome development occurs, we regain our composure and again look with our heretofore optimism on the brilliant results in so many of the gastro-enterostomized patients, where indications were positive and the surgery performed with a finished technique.

Marginal and jejunal ulcers are definite pathological entities, but the clinical history, and the clinical and radiographic findings do not always permit of a definite diagnosis; however, if we keep in mind the possibility of ulcers forming in the vicinity of the anastomosis and the outlines of the symptom-complex found in the literature with roentgen-ray analysis, we may expect a high percentage of accuracy in substantiating a diagnosis of ulcer.

Mindful of the fact that this subject has been frequently called to your attention in literature, I beg your patience in the presentation of one case of jejunal ulcer with a brief review of the literature.

Mr. G. Primary operation Jan. 29, 1918. Patient was almost exsanguinated. Ligation of vessels at pylorus for a severe bleeding ulcer in duodenum. Posterior gastro-enterostomy using continuous linen for inner suture.

Nov. 6, 1918. Relieved of all symptoms for three months, now complains of gastric distress and gas. Roentgen ray shows prompt emptying of stomach through stoma.

Dec. 10, 1918. Still has gastric distress, stomach upset, pain after eating which is worse at night.

Sept. 15, 1919. Much heartburn, belching and vomiting.

Sept. 17, 1919. Fluoroscope of stomach shows meal freely emptying through stoma, also some by pylorus.

Oct. 27, 1920. For six or seven months had had needle-like pain at night around navel region. Takes Sal Hepatica, which relieves pain and he sleeps. During the day he has heartburn.

Feb. 17, 1921. Complaining constantly, more of late.

Feb. 18, 1921. Roentgen ray examination of stomach. This shows fluoroscopically esophagus and cardia negative. Stomach fills well. Stomach normal in position, no peristalsis visible, contents pass out of stoma very freely and very little by pylorus. On pressure he complains of a tenderness more over lesser curvature than in region of stoma. Roentgenograms (eleven pictures) show a constant deformity in lesser curvature opposite stoma; most of the time an incisura and twice a niche. At the stoma outlet there is a constant mass of barium just beyond the opening and thin strands plainly visible (Fig. 1.) which I now feel like interpreting as threads, with barium clinging to them.

Patient seems in considerable distress, complains of much crampy pain after meals, for which he has for the last three years taken either soda or Sal Hepatica. He expresses himself as feeling much the same as for a short period before the primary operation and urges operation (in fact he went to hospital one day before appointed time because of severe pain at night). There was no point of tenderness on pressure nor mass palpable but pain was referred to left side or middle.

A diagnosis of ulcer was made. Either: (1) ulcer lesser curvature; (2) ulcer near pylorus; or (3) jejunal ulcer.

Operation March 9, 1921. Gas oxygen anesthesia with novocain infiltration according to Crile. Incision through scar of former operation, liver presenting. Stomach was brought into the wound and a very careful examination was made of the whole organ but no infiltration could be felt. A scar could not be seen at site of former ulcer, as it was posterior. Pylorus was patent but broadly adherent to omentum. This was freed. Gall bladder was thoroughly embedded in adhesions. Gastro-enterostomy site was examined and at the proximal limb of the jejunum, 1 cm. from the stoma margin, was a crater ulcer. The jejunum was broadly attached to the transverse colon. With the pylorus patent and healed it was thought feasible to undo the gastro-enterostomy and close the opening in the stomach. The attached jejunum was separated from the colon, in which was a large hole. The ulcer had penetrated the jejunum completely and was burying its way into transverse colon. Advantage was taken of this hole and with the index finger the entire inside of stomach was palpated. The finger went through the pylorus into the duodenum, both of which were normal. On examining the margin of the stoma two linen threads were picked out on the right side of the stoma. The jejunal loop was separated from the stomach and the stomach opening closed completely. The ulcer-bearing section of the jejunum was removed and an end-to-end anastomosis made, using catgut for the inner layer and linen for the outer: There seemed sufficient opening through the anastomosis.

*Presented before the Minnesota State Medical Association, Duluth, Minn., August, 1921.

For three weeks the patient did well, when he again had gas and distress. He seemed to be influenced by worries and troubles at home. Diet and alkalies were advised, but not always carried out. Wassermann negative.

May 12, 1921. Roentgen ray showed food going through pylorus freely and no evidence of a dilated duodenum or any evidence of obstruction at our new anastomosis. The radiograph very nicely shows (Fig. 2) the anastomotic ring and a deposit of barium on the remaining shelving part of the anastomosis with a free opening and no spasm. As there was a good deal of induration in the region of the colon close to the stomach stoma, it was kept in mind that there might be a gastro-colic fistula. Patient vomited at times though never foul material, and also passed undigested food, but no occult blood. A barium enema given June 17, 1921, showed absolutely no barium passing into stomach. Patient was kept quiet and put on bromides and general diet, and did very well, indicating that he probably had a pylorospasm. Later he had more distress, belching, food intolerance and vomiting.

Aug. 1, 1921. X-ray of stomach was negative.

Operation again on Aug. 5, 1921, in which we found the bowel anastomosis well healed, stomach stoma closure perfect and pylorus negative. Embedded gall-bladder and mildly inflamed appendix were removed.

Peptic ulcer following gastro-enterostomy was first reported by Braun in 1899. Kocher operated his first case in 1901, which was then the seventh case in history, as reported by Terry. Mayo Robson reported his first case in 1904. Since then there have been added a considerable number of cases with many valuable scientific contributions. Some stated facts of earlier contributions have had to be revised and some have become obsolete because of different types of gastro-enterostomy performed.

The ulcer may be situated in three areas anatomically: (1) On the gastric side of the anastomosis; (2) On the suture line; (3) In the proximal limb, distal limb or mesenteric border of jejunum. By far the greater number appear on the suture line.

No distinction can be made as to percentages of ulcers following anterior or posterior gastro-enterostomy.

Lieblein, in 1915, reported the known cases of jejunal ulcer and quoted statistics by Roojen, giving the incidence of jejunal ulcer as 1.3 per cent; while Patterson in his statistics quotes a percentage of less than 2 per cent. It is quite impossible to arrive at definite conclusions as it may be that all cases are not reported, are not diagnosed, or go to another surgeon for the second operation.



Fig. 1. Radiograph showing incisura at lesser curvature. Spasm at stoma. Barium in crater ulcer and the barium laden threads.

No period in life seems exempt, although statistics are placed to show that 85 per cent occur between the ages of twenty and fifty years. According to Roojen, the youngest case was 2 months old and operated for hypertrophic pylorus stenosis.

The great predominance of male over female is striking, being the same in marginal or jejunal ulcers. Patterson claims that 78 per cent, Roojen 79 per cent and Petren 84 per cent occur in men.

This is explained by the fact that, for instance, in the clinic of Rotgans 76 per cent of primary gastro-enterostomies occur in men while Roojen reports his statistics of peptic ulcer following gastro-enterostomy as 76 per cent in men to 24 per cent in women.

In the cases that had a chemical stomach analysis the majority showed a hyperacidity previous to the gastro-enterostomy. Following these up we find that in the majority of cases there is no change of acidity after the gastro-enterostomy and, following the operative procedure for jejunal ulcer, the acidity again remains the same as before the operation in a great proportion of cases. Judd mentions that the acidity is high after gastro-enterostomy in 60

per cent of the cases. So the analysis of the acidity depends a great deal on the length of the time after the operation. Lieblein draws the following conclusions: "Even though the hyperacidity, especially an excess of HCl, is a frequently recurring finding in the stomach analysis of the cases of peptic jejunal ulcer, it cannot be declared constant."

The interval of comfort varies considerably. In a series of seventy-five cases of peptic jejunal ulcer 75 per cent began having clinical symptoms less than two years after gastro-enterostomy; in seven cases, three and four years; in five cases, four and five years; in one case, nine years and six months; another, ten years after gastro-enterostomy. Very early recurrences are reported, as—two days after operation the patient complains of a new pain, in which a perforating ulcer is found 16 days after operating. This case is reported by Cackovic. Another was free from distress only ten days. Collins reports perforative ulcer six weeks after gastro-enterostomy. But these few known early cases are indeed a very small proportion of a large number of gastro-enterostomies performed.

PATHOLOGICAL ANATOMY

Although a large majority of cases have only one ulcer, reports show cases of two ulcers, some four, and in two instances even five ulcers, all situated in the immediate vicinity of the gastro-enterostomy opening. When there is a jejunal ulcer extending over a long period of time there is an induration in the surrounding tissues and the ulceration extends deeper into the wall and from here extends to the contact tissues and the neighboring organs. It may extend into the mesentery, into the retro-peritoneal tissues, to the abdominal wall or onto the transverse colon as in our case. It may perforate into the colon and establish a jejuno-colic fistula. A number of such cases are reported and have been operated but are associated with a high rate of mortality. Where the extension is toward the abdominal wall, a large, inflammatory tumor is produced and can be palpated under the left rectus muscle. This is most frequent in the anterior gastro-enterostomy. The fact that an ulcer may heal spontaneously is proven in the cases of jejuno-colic fistulæ in which no more ulceration is present, and in some of the narrowed gastro-enterostomy openings, where, because of the healing of the ulcer, the opening has become narrowed.

Roojen distinguishes five types of jejunal ulcer:

(1) Ulcers with no symptoms, which heal ; (2) Ul-

cers with pronounced local and general symptoms; (3) Ulcers which produce an acute perforation; (4) Ulcers which, because of chronic adhesive peritonitis, develop tumefaction and inflammatory infiltration into the anterior abdominal wall; (5) Ulcers which develop into jejuno-colic fistulæ.

Two cases are reported that have perforated twice in two years. Haberer, in 1918, reported that of his ten cases of jejunal ulcer following gastro-enterostomy none were on the anastomosis line but were in the proximal and distal leg and on the mesentery attachment. Haberer in his article states he has never seen a jejunal ulcer in cases where resection was made, frequently when the indirect surgical measures were used for duodenal ulcer and often when the pylorus was stenosed as in simple gastro-enterostomy. But in a recent communication he reports having just operated for jejunal ulcer in a case where pyloric resection had been made, his only case. Haberer states in his conclusion that all jejunal ulcers, post-operative, were in gastro-enterostomy with the shortest loop.

DIAGNOSIS

There are two outstanding questions which constantly confront us in these ulcers: (1) By what symptoms are we to recognize these ulcers? (2) What causative factors are at work producing these ulcers?

The symptoms as stated by various writers may be summed up as follows: (1) Pain after food or without food; (2) Pain usually at night; (3) Pain of a cramp nature; (4) Pain in epigastrium and to left of navel and left rib border; (5) Vomiting blood or blood in stool.

Lieblein states that symptoms may begin any time from a few months to several years after gastro-enterostomy. The ulcer may remain as a simple ulcer over a varying period, even years, but very often it takes on more serious aspects.

When a jejunal ulcer perforates, it is difficult to establish the site. A general peritonitis results, in which case the hole must be found at operation. Where a tumefaction has formed to the left of the navel and toward the left rib border, the diagnosis should be recognized in view of the history. Pain may radiate to the back and to the region between the shoulder blades. The relation of pain to the food intake is variable and does not offer anything constant. In one case food may bring on pain, in another relieve it, while in some pain is by day



Fig. 2. Radiograph after operation, showing ring of end-to-end anastomosis of jejunum.

and others especially at night. Then the jejuno-colic fistula can be recognized by various symptoms such as the vomiting of blood and passing of black stool. In those cases of jejuno-colic or gastro-colic fistulæ in which a chain of symptoms develop with colicky pain in the stomach or to the left of navel, with a diarrhea that resists every remedy, at times a fecal vomiting and fecal belching, with a rapid appearance in the stool of recently eaten food, weakness and rapid loss of weight, we have indications of a short circuiting into the colon. The jejuno-colic fistulæ occur always with a posterior gastro-enterostomy. Various methods of diagnosis have been used. Eiselberg gave an enema of methylene blue and recovered the color by the stomach tube. Kaufman used an enema that contained lycopodium colored with gentian violet. Polya does not consider this method as absolute for he says that there might be a valve action at the gastro-enterostomy opening which would forbid an enema entering. Lieblein and Polya both hold to the roentgen ray examination of the opaque meal entering the transverse colon directly from the stomach. Eiselberg also used a unique method of inflating the colon with air through a rectal tube and then with the screen observing the stomach inflate.

In reference to the roentgen ray diagnosis of marginal or jejunal ulcers, Lieblein feels that the roentgen ray examination offers a diagnostic aid only when a stenosis has formed or when the ulcer has penetrated into another organ which would give us a Haudek's niche. A slow emptying may mean beside a stenosed gastro-enterostomy opening, a narrowing of the distal jejunal limb because of the jejunal ulcer. Carman and Balfour, in an interesting article on jejunal ulcer dealing with the roentgenologic phase especially, say, "It would appear that in nearly all the cases there are definite roentgenologic indications of an abnormal condition, and that in many instances there are more or less direct signs pointing to the location of the trouble."

In our case the findings were quite definite when properly interpreted. There was the penetrating ulcer filled with barium which remained filled in successive pictures, and a constant incisura on the lesser curvature opposite the site of the ulcer which I have not seen mentioned in the literature. Also, what can be interpreted as two threads with barium clinging to it may plainly be seen. Neither have I seen this mentioned. The threads show on the side of the stoma opposite the ulcer. This fact was revealed at the operation when two threads, situated at the right side of the margin, were removed while the ulcer was in the proximal limb of the jejunum on the left side of the stoma.

The etiological agents may be summed up in the following: (1) Faulty technique in controlling bleeding which may cause a hematoma followed by infection and ulcer (W. J. Mayo shows, by a drawing, a case of this kind); (2) Unneutralized acid chyme; (3) Non-absorbable suture material for inner sutures; (4) Too much clamping of tissues or a Murphy button; and (5) Infective agent.

Mayo Robson was an early exponent of the bacterial infection theory. Neuman laid great stress on the mycotic theory. Lieblein brings out the point that the gastric retention, in those cases where there is a pyloric stenosis, where the gastric secretions have been altered over a long period, may be a causative factor in producing an ulcer in a traumatized portion. Lenander Key and Judd each reported a case of jejunal ulcer following gastro-enterostomy for pyloric carcinoma. All other gastro-enterostomies were done for some benign condition. Further causes may be mentioned such

as patients of the working class who have not time and opportunity to care for themselves for a sufficient time following the operation or do not follow out a prescribed order of diet. Abuse of intoxicating drinks is mentioned in the literature.

The arguments that have been advanced in favor of acid chyme as an etiological factor are, that they occur seldom in pyloroplasty and in cancer, and that this portion of the bowel is accustomed to a neutralized or alkaline medium. Terry, in collecting 155 cases, found only one case following gastro-enterostomy for cancer and gave two reasons: (1) less acid chyme; (2) patient does not live long enough.

Another factor is brought out by Lieblein when he calls attention to the lack of anti-pepsin ferment in the blood in case of ulcer of the stomach and duodenum and the localized absence of anti-pepsin ferment in the sutured area due to circulatory disturbance. The cell death by HCl and this followed by pepsin digestion is the dictum of Patterson. Wilkin concludes after animal experimentation and adding HCl to the diet that HCl is not a cause for ulcer formation and that the mucosa heals in seven days. Solid food, trauma and non-absorbable suture delay healing. Other experimenters declare that HCl is the cause. Terry takes the position that the acid chyme is of prime importance as causing ulcer formation following gastro-enterostomy.

Mayo reports that Rosenow has found an interrelation between apical tooth abscesses and gastric ulcer. Erdman reports finding, in duodenal ulcers, evidences of syphilis in two out of five cases and suggests that this may be a factor to include in the ulcers following gastro-enterostomy. Horsley says, in speaking of Rosenow's hematogenous infection, "It is also probable that at the time of the origin of the ulcer, the hematogenous infection produced irritation or inflammation in the gall bladder, appendix, pancreas, kidney and other organs, and the ulcer is merely a survival of multiple lesions."

Terry and Lewisohn report not having found linen or silk threads in the suture line.

Idiosyncrasy is mentioned by Erdman.

Haberer states in a personal communication, "There is no doubt that there are individuals who have a special disposition to ulcer formation."

Lieblein mentions the possibility that non-absorbable suture material may cause a disturbance in wound healing, but of greater moment he holds the

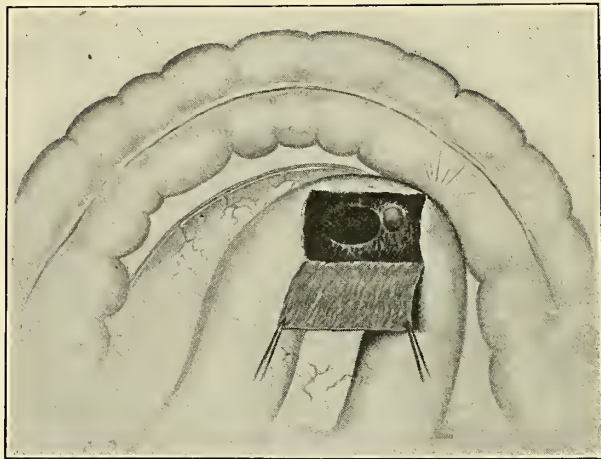


Fig. 3. Drawing showing the jejunal ulcer in proximal limb and attempted perforation into colon.

trauma produced when using a Murphy button. An argument to show that we must look for causes for these ulcers other than the suture material used, is the fact that throughout the literature it is seldom we find recorded that an ulcer forms after a pyloroplasty or Finney's operation. Ware thinks the non-absorbable suture a factor in ulcer production. Terry is of the opinion that non-absorbable suture is much to blame for the ulcers but found no sutures in the three cases he reported. Judd, in reporting 111 cases of the Mayo Clinic recently, notes having found threads in 26 cases. Sistrunk found threads in one case but no ulcer. Ochsner, in a discussion, says he uses silk suture in all his cases but he thinks the anastomosis should be made at the lowest point in the stomach. Carman and Balfour report having found threads in six out of thirteen cases. Gronnerud of Chicago, in 1917, in 5,000 animal experiments found ulcers quite frequently when non-absorbable suture was used. He concluded, "Ulcers of the jejunum following gastro-enterostomy were caused almost exclusively by non-absorbable sutures." Sutton, a few years ago, gave the opinion that, "There is very little evidence available for the incrimination of silk or linen threads." Haberer claims foremost among the technical errors the non-absorbable suture which increases the tendency of ulcer formation. Horsley also points out that non-absorbable sutures are used in pyloroplasty and in intestinal suture without producing ulcer.

Sutton, in an article on jejunal ulcers, makes the observation on one of his cases of perforating jejunal ulcer, seven years after gastro-enterostomy, that the portion of jejunum involved in the loop

was thinned out, had become attenuated and lost its valvulæ. It took on an appearance of the first portion of the duodenum.

Experiments by Gould and Harrington on animals showed that no matter how well the suturing was done, necrosis first occurred and later healing. However, Patterson and Lieblein claim that in the human, healing may be primary, and no doubt often is, but in some cases this may not be complete and in this way lay the foundation for an ulcer.

Several workers champion the circulation theory that the cutting of blood supply, rough handling of tissues, kinking of the mesentery, and the altered position of the jejunal loop are factors. C. H. Mayo, Judd and others lay little stress on trauma as an etiological factor, for surgeons have found all sorts of sharp material in patients' stomach and also greater difficulty would be experienced in wound healing in gastrotomy or gastro-enterostomy.

Horsley thinks the best results are obtained when gastro-enterostomy is done for pyloric stenosis, for then the duodenal contents are not neutralized by the stomach contents passing through the pylorus

Haberer, of Innsbruck, in a personal communication, writes, "My views have remained the same in general, but the thought constantly arises that the ulcer-bearing pylorus, which is left, especially when it is blocked artificially, constitutes a chief danger for the later appearing jejunal ulcer." Lieblein and Eisberg strongly support this contention.

Moynihan of Leeds, in a personal communication, states, "I am not at all sure as to the cause of jejunal ulcer, for probably many factors are at work, among the most important being: (1) a continuance of the septic poisoning; (2) persistence of suture material; (3) hyperacidity; (4) technical defects, such as imperfect approximation of the mucosa, development of a hematoma and the employment of too many sutures which devascularize the suture line."

Lieblein, of Prague, in a recent letter, takes a more specific stand as to etiology. He makes a distinction between the marginal and jejunal ulcer, stating, "The ulcer on the anastomotic ring certainly has its origin in the technical error of proper adaptation or necrosis of the mucosa from sutures pulled too tightly and this followed by digestion

in the presence of gastric secretion." He lays no stress on the non-absorbable suture nor the applied clamps, saying that a surgeon naturally uses his judgment as to the amount of pressure applied. As to the etiology of jejunal ulcer he feels that the chief cause is the acid chyme which is entirely foreign and abnormal to this part of the bowel. This now seems scarcely plausible when only 1.5 per cent of gastro-enterostomies are complicated by ulcers.

THERAPY

A thorough, well regulated medicinal therapy is advisable. Lieblein wishes to impress the value of internal medication in citing a case of a large inflammatory tumor, treated medically, with rest in bed, hot moist fomentations, atropine, and ulcer diet. He had a complete cure.

In the perforated ulcer the same rule holds as in any perforation, closing over the ulcer and suturing onto it a piece of omentum. Should a perforation occur in the presence of a large, inflammatory tumor it would be advisable to insert a drain and in this way establish a jejunal fistula (as advised by Lieblein) and only when conditions are very favorable, to attack the tumor mass. Only surgery has anything to offer for the jejuno-colic fistula. Where it is feasible to separate the false communication between the jejunum and colon, or stomach and colon, as the case may be, both openings should be sutured. Such a procedure with success has been reported by Eisenberg, Lyon and Polya. Others, who found it necessary to do more surgery, such as colon resection or other anastomosis either by suture or Murphy button, had fatal results. Spassukozki found it necessary to make an extensive resection in one case of part of the transverse colon, the jejunal loop and a portion of the stomach, reuniting the wounds of the stomach, colon and jejunum, releasing a gastro-enterostomy and re-establishing a normal passage through the pylorus, as this was healed; the patient recovered but unfortunately he had a recurrence of symptoms at the pylorus. Lieblein says, "The re-establishment of normal conditions should only be considered if the primary condition is fully healed." This was the situation in our case.

Curetting the ulcer has failed. Establishing a jejunostomy also has not succeeded in diminishing the gastric secretion when food was taken. Lieblein says, "It is a mistake to think that a jejunostomy can eliminate the stomach functionally."

Of the more radical operations are mentioned the excision of the ulcer, removal of the ulcer bearing bowel (either the jejunum or transverse colon or even a part of the stomach), release of the gastro-enterostomy and re-establishment of the original route, or a second gastro-enterostomy with entero-anastomosis.

The difficulty was met with in our case when the gastro-enterostomy was released and an end to end anastomosis done, that a short loop had been used so it was embarrassing to get sufficient jejunum in the proximal limb to make the anastomosis.

Some authorities state that following the radical operation for jejunal ulcer 50 per cent of cases have more or less recurrence of symptoms. Concerning the therapeutics Lieblein concludes with this advice: (1) The gastro-enterostomy should be done only for definite indications; (2) Prophylaxis for jejunal ulcer should be continued over a long period.

In his communication of May 5, 1921, regarding the treatment of jejunal ulcers, Moynihan writes, "I have had a good many cases lately and so far have treated all but one of them by gastrectomy, removing the stomach to a point proximal to the anastomosis."

In perforated jejunal ulcer the mortality is 75 per cent, being much higher than that of the perforating gastric or duodenal ulcer. In operating for a jejuno-colic fistula the mortality is stated as 39 per cent, while with the inflammatory tumor formation a rather favorable prognosis is offered.

CONCLUSIONS

1. Gastro-enterostomy should be done only on very positive indications.
2. Following gastro-enterostomy a long period of prophylaxis should be carried out.
3. Gastro-enterostomy should be performed with as little trauma as possible as herein lies a cause for the marginal ulcer.
4. Although the question of the suture is still in the balance, it is advisable to discontinue the use of non-absorbable suture material.
5. One factor in the etiology of jejunal ulcer lies in the new physiology of acid chyme impact on mucous membrane with alkaline habits.

I wish to express my sincerest appreciation to Sir Berkely Moynihan, J. Shelton Horsley, J. W.

Mayo and C. H. Mayo for the privilege of using their cuts for lantern slides, and to Victor Lieblein, Von Haberer and Sir Berkely Moynihan, for their valuable personal communications.

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DISCUSSION

DR. W. C. CARROLL, St. Paul: There has been a great deal written on this subject, and Dr. Schuldt in his excellent paper and review of the literature brings the subject up to date. I wish to coincide with what he has said, that gastro-enterostomy should be done only for diseases and not for symptoms, because a certain definite percentage of cases are followed by duodenal or gastric duodenal ulcers.

As to the causes of this condition, he has cited various theories, and perhaps all of them at times are factors. The chemical one is perhaps the most important and that brings up the point that our patients must be followed up after operation. They should not be dismissed after they leave the hospital and allowed to eat everything, but they should be put on a well regulated medical routine or diet. This should be kept on for a variable length of time, depending on the case.

Focal infection is a very important factor, and I do not think these patients should have their focal infections removed just previous to or just after gastro-enterostomy. That was brought home to me by a recent case of my own on whom I operated about a year ago, using cat-gut sutures; six weeks after the operation the patient had a number of abscessed teeth extracted. He was well up to that time, but right after the extractions he had a recurrence of his old symptoms, which did not yield to medical treatment and later led to operation, at which time a gastro-jejunal ulcer was found.

As to the diagnosis, a careful history is important. A recurrence of his previous symptoms with perhaps localization of the pain to the left of the middle line instead of to the right, is always suggestive. Carman states that the best method in making a differential diagnosis is the x-ray.

The complications that occur have been mentioned, and most important is the gastro-colic fistula. Dr. Judd has recently pointed out a way to avoid this complication by suturing the mesocolon higher up on the stomach after doing a gastro-enterostomy; that is, keeping it away from

the line of anastomosis where it used to be sutured, as the scar tissue pulled the colon down.

There is no series of cases reported where the medical treatment has been used. However, I think Eusterman states that every case, if seen early, ought to be given the benefit of medical treatment.

Unquestionably the avoidance of traumatism at the time of operation is very important but I do not think it plays as great a part as some believe because the men who are using clamps and doing a great deal of work are still continuing to use them. Suture material for a while was thought to be the most exciting factor in the production of gastro-jejunal ulcer, but in a recent article in the *Journal of the American Medical Association* quite a number of cases are reported and in not a single case was a silk or linen suture used.

The most important point is the prevention of these ulcers and this is best accomplished by closely observing these patients after operation, and insisting on their learning how to take proper care of themselves and to follow the proper diet.

DR. J. FRANK CORBETT, Minneapolis: I would like to report a rather unique case. A young man, who had duodenal ulcer, bled profusely, and after a gastro-enterostomy was done, was much better for a little time; then he had another hemorrhage, followed by another operation, with excision of the ulcer with cautery; another hemorrhage. When I saw him his hemoglobin was so low that we could not measure it. The striking thing about the case was the delayed coagulation of blood. The blood hardly coagulated. I gave that man 10 c.c. of blood in the vein; at the end of six hours more 10 c.c. and at the end of 48 hours I gave him a good transfusion, after which the bleeding stopped, and the coagulation time was normal. He was put on medical treatment. He improved so that it looked as if he was going to get along all right. Within a comparatively short time a little bit of blood came in the stools. Dr. Graves gave him 2 c.c. of blood and the occult blood disappeared from the feces, and today, after a period of four or five months, the patient is apparently cured. I thought the case was sufficiently interesting to report it.

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No. 4

EDITORIAL

Duluth and Saranac

Elsewhere in this journal is a statement prepared by Dr. A. T. Laird, superintendent of Nopeming Sanatorium, St. Louis County, showing a comparison of the climatic features of our Lake Superior region with that of the justly famed Saranac Lake. It was Trudeau who made the Adirondacks popular, and not the exclusive qualities of that mountain region. Many of the earlier Minnesota doctors will recall the fame in which Minnesota was held as an early health resort; and not a few doctors came out here from the East, either on account of their own health or threatened tuberculosis in their families.

It is not to be presumed that Saranac Lake and Duluth are the only regions heavily endowed with natural advantages assisting in the cure of tuberculosis. Our nation is rich in variety, and opportunities abound. Yet, in recent years, Minnesota has allowed other states, with less advantages, to supplant her in popular estimation; Minnesota's climate, and particularly that of the Lake Superior region, has been most seriously maligned. For some of this we can thank the straw hat and the ubiquitous B. V. D.: A man starts on a vacation in a sleeper, gets up in Duluth, dons his light togs, greets a delightful and stimulating zephyr from the greatest fresh water body extant, and, because

his unaccustomed femoral epiphyses set forth a clatter that clouds his cerebration, he forgets that almost every day is windy in Kansas, that the sun exposes itself only occasionally in Chicago, and that Duluth's average day and night the year around is not far from ideal. The figures presented by Dr. Laird are gratifying to Minnesota.

Trudeau's was a spiritual accomplishment; in the burning out of his own life from tuberculosis he created a glow of hope that has flashed around the world and will continue with that mysterious permanence granted only to those who have climbed the mountain and beheld the light unmasked. What he saw he inscribed in the minds and hearts of his followers, and, even as Moses, he wrote into the very stones that formed the structures that now dot our land and have robbed tuberculosis of much of its horror and more of its suffering.

Not the least among Trudeau's followers has been Longstreet Taylor of Minnesota. Even New York State has not accomplished as brilliantly as Minnesota, and credit is largely due to Taylor for fighting the early battles and stabilizing the sanatorium idea among us.

The death rate from tuberculosis in Duluth in 1910 was 129.3 per 100,000 of population; in 1920 the rate had been reduced to 84. Other associations feature Minnesota's natural and acquired resources; we who know the most about it should boldly feature the matters pertaining to health. E. L. T.

Tuberculosis

Since pulmonary tuberculosis has for so many years and until very recently headed the mortality statistics of civilized nations as the most destructual agent of human life, it is rather remarkable that its recognition is still a stumbling-block to many physicians. The importance of an early diagnosis, both to the patient and his family, is conceded. Nevertheless, so many cases are not diagnosed until in the far advanced class that it is still a live question and one of perennial interest.

The disease itself, on account of the insidious character of its onset, deludes its victims into the belief that they are not seriously ill, and do not require the services of a physician. In this class of cases, and their name is legion, the profession can in no wise be held responsible for the late diagnosis.

The number of unrecognized cases can be demonstrated in various ways, by autopsies of persons who have died of other diseases, or who have met violent deaths, which show an active or healed pul-

monary tuberculosis in a surprisingly large number of cases. Careful physical examinations of large numbers of men applying for the army or navy, routine examinations of employees, or life insurance examinations, frequently discover cases formerly unsuspected. Then again, the diagnosis of an incipient case of pulmonary tuberculosis is an exceedingly difficult one to make if the case is truly an early one. Physical examination of such a case can reveal but little, as the signs are not pronounced and easy of detection until actual destruction of the tissue of the lung has taken place. But given a young adult with vague and indefinite indications pointing to pulmonary tuberculosis, the chances are decidedly in favor of tuberculosis being present, since it is an exceedingly common disease at this age, and the profession should not hesitate to make a tentative diagnosis of pulmonary tuberculosis subject to the result of subsequent tests. The absence of tubercle bacilli from the sputum proves absolutely nothing, and their presence in the sputum shows that an early diagnosis has not been made. The profession is too prone to rely upon the laboratory report of the examination of the sputum almost entirely in making the diagnosis of pulmonary tuberculosis, to the exclusion of a careful study of the clinical picture presented by the individual case. Laboratory tests, "with the glamour of science and the romance of novelty," cannot supplant entirely the study of each individual with the sharpened observation due to long acquaintance with the danger signals.

The laboratory has proved itself of immense value to the profession, but like everything else is not infallible, and in the question under discussion has too often delayed a positive diagnosis, which should have been made by a careful analysis of the patient's symptoms and a painstaking exclusion of other possible conditions. We have to deal with a bacterial disease with a local expression and a number of constitutional manifestations which show the disturbed balance between the virulence of the pathogenic bacteria and the specific resistance of the individual. On the other hand, there are rare cases in whose scanty sputum tubercle bacilli may be found but whose chest is negative even when examined with the greatest care. The diagnosis must often be made in the absence of signs in the chest by the exclusion of other toxemic conditions that may resemble the symptoms of tuberculosis toxemia. These symptoms may not suffice for a posi-

tive diagnosis but they arouse suspicion and Pottenger has very wisely told us that the most important thing for the clinician is to know when to suspect the presence of tuberculosis.

The symptoms which should arouse suspicion of the presence of tuberculosis and lead to a thorough study of the case, are, first and foremost, cough, especially on arising in the morning, at which times there may be a few short coughs, with or without any expectoration. At the same time the patient may be conscious of a slight degree of debility, of the fact that he tires more readily than formerly, that he has lost a little weight, and that his dyspeptic symptoms have grown more annoying. The significance of hemorrhage is generally understood, as is a persistent tickle in the throat, which gives rise to cough accompanied by a slight hoarseness. A slight fever and rapid pulse, with or without chills, and sweating at night, point unmistakably to the necessity of thoroughly testing the patient for the presence of tuberculosis. The same is true of anemic conditions not otherwise accounted for, and of protracted convalescence from an acute disease. Although not a disease, yet pregnancy and labor come in under this category, and every woman with latent tuberculosis is especially liable to have it become active after childbirth. Many cases of tuberculosis masquerade under the name of influenza.

A tentative diagnosis of pulmonary tuberculosis should be made from the patient's history and symptoms, especially if the physician knows when to suspect its presence. Diseases which must often be excluded, such as neurasthenia, hyperthyroidism, chlorosis, typhoid and paratyphoid, malaria, focal infections, septic endocarditis and chronic bronchitis, all can be eliminated by patience and careful observation. Good x-ray stereo pictures can exclude many of these diseases, and are especially valuable as a means of corroborating a diagnosis. Since the use of the x-ray has become so universal, many more cases of neoplasms in the lungs have been recorded than ever before and one condition that has caused much confusion has thus been removed.

In doubtful cases, it is far better to suspect a patient of having tuberculosis, who is free from it, than to give a clean bill of health to one whose chest is negative but in whom tuberculosis is present.

H. L. T.

Eligibility of Delegates for the Presidency

In Section 3, Article IX of the Constitution and By-Laws of the Minnesota State Medical Association there is the following provision: "The officers of this Association shall be elected by the House of Delegates on the morning of the last day of the Annual Session, but no Delegate shall be eligible to any office named in the preceding section, except that of Councilor, and no person shall be elected to any such office who is not in attendance upon that Annual Session, and who has not been a member of the Association for the past two years."

In the session of the Fifty-third Annual Meeting some question was raised as to the wisdom of the provision. In the discussion it was stated that a precedent was established at the time of the election of J. W. Little to the Presidency in the meeting of 1915. In looking over the proceedings of the Society there is no record to indicate that Dr. Little was ever seated in the House of Delegates at that session. At the last session it was stated as a personal opinion of one Delegate that "At the next meeting of the House of Delegates someone should introduce an Amendment to the Constitution which will do away with this provision."

We feel that it is the duty of MINNESOTA MEDICINE as the official organ of the State Medical Society to call the attention of its members to these matters which are under discussion. The members should decide whether or not this provision works to the best advantage of the Society. If it does it should be adhered to and not be over-ridden by the members of any one House of Delegates. If it is not in the best interests of the Society the Section should be properly amended. We feel that the provision is a wise one and that it has as its chief argument the desirability of eliminating personal politics and trading from the House of Delegates. It hardly seems likely or possible that in any one year all of the members of the State Society eligible for the Presidency should be in the House of Delegates. The President of the State Society should be selected with a view to his personal fitness for the office after a thorough canvass of the situation by the membership of the House of Delegates. It is more likely that the problem would be given careful and unbiased consideration if every member of the House of Delegates realized that he were eliminated from consideration for the office. If any district society has a man whom it considers a desirable candidate for this office, it would be quite pos-

sible for it to make such suggestion or nomination through its Delegates. It would seem to be more appropriate if such a candidate were not a member of the Delegation. We believe the provision in the Constitution is a wise one and that it should be adhered to by the House of Delegates.

F. L. ADAIR,
For the Editing and
Publishing Committee.

The American Congress of Internal Medicine and Minneapolis Clinic Week

The annual clinical meeting of the American College of Physicians, known as the American Congress of Internal Medicine, is scheduled to meet in Rochester and Minneapolis this month. There will undoubtedly be members in attendance from all over Canada and the United States.

The purpose of the College is the standardization and elevation of internal medicine and the allied specialties, and the College bears the same relation to internal medicine that the American College of Surgeons does to surgery. Although a younger institution (this being the sixth annual meeting) there is little doubt but that the College of Physicians will before long hold up its end in the praiseworthy attempts instituted by the profession for raising the standard of practice of medicine in general.

The College of Physicians and the Congress of Internal Medicine are two rather distinct organizations, having separate constitutions and officers. Only members of the College, who, by the way, are entitled to affix the letters F. A. C. P. or M. A. C. P. to their names, are entitled to attend the meeting of the College held during the week of the Congress. Any member of the profession, on the contrary, who is a member of his local society may become a member of the Congress and attend the scientific meetings.

Minneapolis Clinic Week has been arranged for the following week (April 10-13). This arrangement enables visiting physicians to conveniently attend both meetings. The yearly growth in size and importance of this yearly clinic week, held under the auspices of the Hennepin County Medical Society, is too well known to require special mention. The great variety of clinical material offered by members of the profession recognized among the leaders of the profession in our state provides an invaluable opportunity for visitors. The program appears in this number of the Journal.

OBITUARY

J. E. Bowers, M. D., Duluth, Minn. Graduate of University of Michigan. Age, 80 years. Died February 23, 1922.

NEWS OF THE HOSPITALS

Miss Lynne Gilky has been appointed historian at St. John's Hospital, St. Paul. Miss Laura Herring, of the same hospital, has recently been appointed night supervisor.

Dr. O. F. Melby was re-elected president of the Oakland Park Sanatorium, Thief River Falls, at the recent annual meeting of the sanatorium board.

Drs. Plondke and Chatterton, of the staff of St. John's Hospital, St. Paul, recently read papers before the Cumberland, Wisconsin, Medical Society.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

THE ST. LOUIS MEETING OF THE AMERICAN MEDICAL ASSOCIATION

The arrangements of the St. Louis profession for the meeting places for the session of the A. M. A., which is to be held in their city May 22-26 next, are singularly fortunate and convenient; never has the association been so well favored in this respect. The district in which the meeting is to take place is at the west edge of the business section of the city, easily accessible from all directions by street car or otherwise and not more than fifteen minutes' street car ride from the most distant hotel. The grouping of the meeting places is so compact that should one walk from the Registration Building (Moolah Temple) to the farthest hall it can be done in ten minutes or less; from section to section is a matter of from one to five minutes. The convenience of the location and arrangements of the different halls is more outstanding than in any other city in which the association has met, and a decided improvement over the accommodations which were had at the meeting in St. Louis, 1910.

The Registration office, Post Office and Commercial Exhibit is to be in the Moolah Temple (Shrine), a beautiful and commodious building on Lindell Boulevard, two blocks west of Grand Avenue. At the other extremity of the group is the Odean, the home of the St. Louis Symphony Orchestra, with a main hall which seats better than 2,000, and several lesser halls. The main hall will be used for the opening session. Its acoustics are particularly good and suited to our purpose. The Sections on Practice of Medicine and of Diseases of Children meet here. In the assembly hall of the same building the Sections on Pharmacology and Therapeutics, and on Pathology and Physiology, will meet. (It will be noted that there has been an aim to foregather closely allied sections.) The Sheldon Memorial, a very beautiful new hall on Washington Avenue, one-half block west of Grand Avenue, which most admirably meets all requirements, will be the meeting place of the Sections on Ophthalmology, and

Laryngology, Otolaryngology and Rhinology. The Section on Surgery, General and Abdominal, and on Obstetrics, Gynecology and Abdominal Surgery, will be held in the Third Baptist Church on Grand Avenue, a situation well suited to the demands. The Sections on Orthopedics and Nervous and Mental Diseases will meet in the Law School of the St. Louis University, on Lindell Avenue, a few steps west of Grand. The hall easily seats 500 and is both comfortable and convenient. Dermatology and Syphilis and Urology will use the large Union Methodist Church, on Delmar Avenue, just west of Grand, which meets every requirement. The Sections on Gastro-Enterology, Proctology and on Preventive Medicine will use the large hall in the Musicians' Club on Pine Street, east of Grand Avenue, and next to the building of the St. Louis Medical Society, where the House of Delegates will hold its sessions. The Section on Stomatology is assigned to the assembly hall of St. Peter's Parish House, one block west of Grand on Lindell. Immediately in this district will be found three of St. Louis's most important clubs, the St. Louis, University and the Columbian. Restaurants catering to every grade of patronage are numerous in the district and precautions have been taken to insure that normal rates continue during the meeting.

The St. Louis profession is preparing for an unusual attendance; hotel reservations are coming in rapidly, but it is purposed that even the late comer shall be comfortably housed. The wise traveler, however, makes his reservation as early as he finds it possible. Dr. M. B. Clifton, 3525 Pine Street, St. Louis, is Chairman of the Committee on Sections and Section Work.

MINNESOTA STATE MEDICAL ASSOCIATION

October 11, 12 and 13, 1922

Minneapolis, Minn.

OFFICERS

J. Frank Corbett, M. D., Minneapolis.....President
S. H. Boyer, M. D., Duluth.....First Vice President
A. W. Ide, M. D., St. Paul.....Second Vice President
John Williams, M. D., Lake Crystal.....Third Vice President
Carl B. Drake, M. D., St. Paul.....Secretary
F. L. Beckley, M. D., St. Paul.....Treasurer
Section on Surgery—

E. K. Green, M. D., Chairman, 808 Physicians & Surgeons Bldg., Minneapolis, Minn.

E. M. Jones, M. D., Secretary, 1014 Lowry Bldg., St. Paul.

Section on Medicine—

J. G. Cross, M. D., Chairman, Donaldson Bldg., Minneapolis.

David M. Berkman, Secretary, care Mayo Clinic, Rochester.

Communications regarding the coming meeting of the State Association may be addressed to either the chairman or secretary of the respective sections, or to the secretary of the Association, 403 Central Bank Bldg., St. Paul.

MINNEAPOLIS CLINIC WEEK

APRIL 10-13

Headquarters will be at the Radisson Hotel where visitors will register and receive daily programs and obtain any desired information relative to hospitals, clinics, etc.

Each morning will be taken up by clinical demonstrations in each of the hospitals. These will cover all of the branches of both medicine and surgery from the standpoint of diagnosis and treatment. Hospital demonstrations will be over at 2:00 P. M., and at 3:30 P. M. the afternoon meetings will begin. These meetings will be held at the Radisson Hotel. From 3:30 to 5:30 P. M. each day a symposium will be given on the following subjects:

Monday—Obstetrics

Tuesday—Pediatrics

Wednesday—Goitre

Thursday—Cancer

Special attention is to be paid to diagnosis and treatment and talks will be illustrated by lantern slide and chart demonstration and whenever possible by the patients.

At the close of the afternoon session the program for the next day may be obtained.

On Tuesday evening, April 11th, the Hennepin County Medical Society will hold its annual banquet at which a prominent visitor will speak. All out-of-town visitors are urged to attend. It is also understood that the Society of Ophthalmology and Otolaryngology will have an evening entertainment to which all are invited.

Entertainment for visiting ladies is being planned by the Ladies' Auxiliary of the Hennepin County Medical Society.

CLINIC WEEK PROGRAM

Radisson Hotel Hours: 3:30 to 5:30 P. M.

MONDAY, APRIL 10TH

Presiding—Dr. George D. Head

1. The Prospective Mother—Her Care...Dr. C. O. Maland
2. The Treatment of Pernicious Vomiting of Pregnancy Dr. R. T. LaVake
3. The Treatment of Eclampsia.....Dr. J. H. Simons
4. The Present Status of Operative Obstetrics.....

Dr. F. L. Adair

5. The Treatment of Puerperal Sepsis...Dr. C. G. Weston
6. The Differential Diagnosis and Treatment of Dysmenorrhea Dr. J. C. Litzenberg

TUESDAY, APRIL 11TH

Presiding—Dr. A. A. Abbott

1. Care and Treatment of the Premature. Demonstration of the Simple Home Apparatus.....
Dr. F. C. Rodda

2. Treatment of Constipation and Diarrhea in Infancy and Childhood. Demonstration of Practical Points in Stool Analyses.....Dr. Rood Taylor
3. Treatment of the Under-nourished Child. Practical Points Dr. N. O. Pearce
4. Treatment of the Nervous Child...Dr. E. J. Huebckens
5. Treatment of the Diseases of the Heart in Infancy and Childhood.....Dr. Max Seham
6. Drug and General Therapy in Infancy and Childhood.....Dr. F. W. Schlutz

WEDNESDAY, APRIL 12TH

Presiding—Dr. Robert Emmett Farr

1. The Endemic Goitre Problem—Prophylactic Treatment. Pictures and Slides.....Dr. George Fahr
2. The Röntgen Treatment of a Toxic Goitre. Lantern Slides and Pictures.....Dr. R. G. Allison
3. Surgery in Toxic and Exophthalmic Goitre.....
Dr. Jas. A. Johnson
4. The Heart in Toxic Goitre.....Dr. Olga S. Hansen
5. Correction of External Nasal Deformities. Demonstration of End Results in Patients..Dr. J. D. Lewis

THURSDAY, APRIL 13TH

Presiding—Dr. Archa E. Wilcox

1. Why We Need a Psychopathic Hospital at the University.....Dr. Arthur S. Hamilton
2. Differential Diagnosis between Constitutional Inferiority and Brain Tumor, with Demonstration of Patient.....Dr. W. A. Jones
3. Treatment of Ureteral Stone—Lantern Slides....
Dr. Gilbert J. Thomas
4. A Series of Radium Slides Illustrating the Results Obtained by Radiation in the Treatment of Skin Malignancy.....Dr. F. S. Bissell
5. The Meyer Operation and After-treatment of Club Foot—Lantern Slides.....Dr. Emil Geist
6. Surgical End Results in Gastropexia — Lantern Slides.....Dr. Ivar Sivertsen

SOUTHERN MINNESOTA MEDICAL ASSOCIATION

The midsummer meeting of the Southern Minnesota Medical Association will convene at Rochester, Minnesota, Monday and Tuesday, June 19 and 20, 1922.

The program for Monday and Tuesday forenoons will be clinical in character. All departments of the Mayo Clinic will give clinics and demonstrations at each hospital. The program for the afternoons of Monday and Tuesday will be scientific. The midsummer banquet will be held Monday evening, June 19, at the New Kahler Hotel.

OF GENERAL INTEREST

Dr. C. S. Ehrenberg has severed his connection with the Willmar Clinic, Willmar, and is now residing in Minneapolis, his former home.

Dr. Frank S. Schoonover, of the Mayo Clinic, was married at Fort Worth, Texas, on February 9th, to Miss Ann Maurice Simmons, daughter of Dr. and Mrs. Charles B. Simmons, of that city.

Dr. R. C. Adams, of Bird Island, has been spending some time in the Twin Cities, where he has been taking review work at the various hospitals.

Dr. Chester H. Clark, of Greenbush, has gone to New Mexico, where he will do surgical work in a large hospital for a few months. If he finds his work and the climate agreeable, he intends to locate there permanently.

Dr. M. P. Gerber, of Duluth, has joined the firm of Thabes, Badeaux and Nordin, of Brainerd.

Dr. and Mrs. T. Tennyson, of Minneapolis, are spending the remaining part of the winter in California.

Dr. H. B. Grimes, secretary of the Watonwan County Medical Society, has been elected mayor of Madelia.

Dr. Frank Lynam, well known Duluth physician, has been honored with an appointment from Herbert Hoover, head of the American Relief Association in Russia, as one of the six doctors to be chosen in the United States to go to Russia to carry on the relief work being done there. He sailed from New York March first.

The American Congress on Internal Medicine will meet in Rochester, Minnesota, April 3 to 6 inclusive.

The course in Public Health Nursing will be offered in the Spring Quarter, commencing March 29, 1922, at the University of Minnesota. Candidates should present a high school diploma or its equivalent. Applications for admission may be addressed to Miss Marion L. Vannier, Acting Superintendent, School of Nursing, University Hospital, University of Minnesota.

Ernest Harold Baynes, the well-known American naturalist, recently lectured before the Mayo Clinic staff in Rochester on the subject, "Our Animal Allies in the World War." In collecting material for this lecture, Mr. Baynes went abroad as a special correspondent for Harper's Magazine and spent eight months in Europe, Egypt, and Palestine.

Mr. Baynes is making a tour of the country lecturing in various cities on animal life. As a naturalist his contributions have been many and valuable. He is the founder of the American Bison Society, which has preserved the buffalo from extinction, and he has organized a large proportion of the various bird clubs in this country.

The Board of Governors have fixed on May 29 and 30 for the fourth annual meeting of the Association of Resident and Ex-Resident Physicians of the Mayo Clinic, the meeting to be held in Rochester. These dates immediately follow the dates of the St. Louis meeting of the American Medical Association.

Dr. Winford H. Smith, Superintendent of Johns Hopkins Hospital, and Dr. L. B. Baldwin, Superintendent of the University of Minnesota Hospitals, visited the Mayo Clinic and affiliated hospitals last month.

A group of officials from the Medical School of Columbia University and the Presbyterian Hospital of New York City visited the Mayo Clinic and affiliated hospitals last month. The visitors included Mr. William Sloane, President of the Board of Managers of the Presbyterian Hospital; Mr. Edward Harkness, Chairman of the Joint Administrative Board of the two institutions; Mr. James Gamble Rogers, Architect; Dr. C. C. Burlingame, Executive Officer of the Joint Board, and Dr. William Carrach, Dean of the College of Physicians and Surgeons of Columbia University. Plans are being completed for new buildings for the Medical School of Columbia University and the Presbyterian Hospital, and the committee was interested in seeing the clinic from the standpoint of construction, organization, and administration, with the view of gaining information helpful in completion of their plans.

Dr. R. S. Mussey of the Mayo Clinic has returned from a four weeks' clinical trip spent in visiting obstetrical wards of hospitals of the East.

Dr. Clinton R. Stauffer, Professor of Geology at the University of Minnesota and an authority on paleontology, gave an illustrated lecture, "The Ancient Reptiles of North America." The lecture was held in the Assembly Room at 8 p. m., under the auspices of the Mayo Foundation Chapter of Sigma XI.

Dr. Rosenow has returned to Rochester from Indianapolis, Indiana, where he attended a dinner given in his honor by the medical and dental societies of that city. Dr. Rosenow, who was the speaker of the evening, chose for his topic, "Experimental Results of Focal Infection and Elective Localization, and a Discussion of Their Clinical Significance."

Dr. and Mrs. W. J. Mayo, Dr. and Mrs. Balfour, Dr. and Mrs. H. S. Plummer, Dr. Lemon, and Mr. and Mrs. Kahler and daughter, Mary, left Chicago March 4, with Dr. A. J. Ochsner and his party for a month's trip in Mexico. En route to Dr. Ochsner's ranch, near the Pacific coast, the party will visit Mexico City, Guadalajara and Colima. They expect to return about April 2.

The Alpha Kappa Kappa Medical Fraternity of the University of Minnesota met in Rochester Saturday, March 4. A smoker and get-together was held in the University Club Rooms Friday evening at nine o'clock.

A clinical program was given Saturday followed by a banquet at the Hotel Kahler.

Dr. Wm. J. Kucera has returned to Hopkins after a six months' post-graduate course in Chicago and New York in diseases of the eye, ear, nose and throat.

The dates for the next two examinations of the National Board of Medical Examiners are as follows:

Part I and II, June 19, 20, 21, 22 and 23, 1922.

Part I and II, September 25, 26, 27, 28 and 29, 1922.

Applications for the June examination should be in the Secretary's Office not later than May 15th, and for the September examination not later than June 1st. Application blanks and Circulars of Information may be had by writing to the Secretary, Dr. J. S. Rodman, 1310 Medical Arts Building, Philadelphia, Pa.

A Public Health Institute was held at the University campus for one week during March under the auspices of the United States Public Health Service, the State Board of Health and the Medical School of the State University. This is one of a series of some twenty similar institutes which are being held at various centers throughout the country.

The program of this meeting included two distinct courses—one dealing with Venereal Disease, and the other with problems of Maternal and Infant Hygiene.

The following are the registrations for the first day:

	Clinics	Lectures only	Total
Course One	29	7	36
Course Two	41	18	59
	—	—	—
Total Registration	70	25	95

The personnel of the registrants included thirty-five physicians and sixty public health nurses and social workers.

The physicians showed most interest in the lectures and clinics on venereal disease, most particularly in the midday venereal clinics at the University and in the special clinics such as that on endoscopy.

The Maternal and Infant-Welfare Clinics attracted the larger registration among the nurses and social workers who attended the institute. Dr. F. R. Green, of Chicago, Secretary of the Council on Health and Public Instruction of the A. M. A., gave a public lecture on Monday evening at the East High School, Minneapolis, and also two forenoon lectures in the regular courses of the Institute.

The Minnesota Pathological Society of the University of Minnesota School, held an interesting meeting on the evening of Tuesday, March 21, 1922. Dr. H. L. Parker, of Rochester, and Drs. P. A. Ward and Hal Downey, of Minneapolis, presented papers.

The annual address of Alpha Omega Alpha Honorary Medical Fraternity was given by Dr. I. A. Abt, Professor of Pediatrics of Northwestern University, Wednesday, March 29th, at 8:15 P. M. in the Anatomy Amphitheatre, University of Minnesota.

The Wabash Railway announces that arrangements have been made with the Chicago Committee for special train service out of Chicago to St. Louis to the meeting of the American Medical Association to be held in St. Louis May 22nd to the 26th.

The special trains will leave Chicago at 11:45 P. M., Monday, May 22nd, arriving St. Louis at 7:45 A. M.

In addition the Wabash has four regular trains daily leaving Chicago as follows: 9:30 A. M.; 12:02 Noon; 9:20 P. M.; 11:45 P. M.

The rate authorized for this meeting is one fare and one-half for the round trip, \$31.11, from the Twin Cities, good going and returning via Chicago or going and returning direct via the M. & St. L. and Wabash. The round trip rate from Chicago to St. Louis is \$17.62. Sleeping car rates, Chicago to St. Louis:

Lower Berth	\$3.75
Upper Berth	3.00
Drawing Room	13.50

Reservations for berths on the special train can be made through Dr. Harger, 25 East Washington St., Chicago, who will hold the sleeping car diagrams for Minnesota delegates who desire to join the special.

CORRECTION

In reporting the personnel of the officers of the Hennepin County Medical Society, in the last issue of MINNESOTA MEDICINE, we inadvertently omitted the name of Dr. A. E. Hedback, who has been appointed first vice president.

MISCELLANEOUS

TO PHYSICIANS AND SURGEONS:

The members of the Industrial Commission are apprehensive that workmen suffering permanent partial injuries as the result of industrial accidents are not always receiving the proper amount of compensation to which they are entitled because the attending physician is not conversant with certain provisions of the Workmen's Compensation Act. We, therefore, call your attention to the following express provisions of Section 14 of the Act which relate to permanent partial injuries:

"The loss of the first phalanx of the thumb, or of any finger, shall be considered equal to the loss of one-half of such thumb or finger.

"The loss of one and one-half or more phalanges shall be considered as the loss of the entire finger or thumb."

Similar provisions are made for loss of toes.

"In all cases of permanent partial disability it shall be considered that the permanent loss of use of a member shall be equivalent to and draw the same compensation as the loss of that member."

We request that when reporting amputations you give the point of amputation and its effects on other parts of the member. When reporting loss of motion, give the various joints affected and the amount of loss in each, stated in percentage.

The Minnesota Supreme Court has ruled (Butch vs. Shaver, 184 N. W. 572), that in compensating for eye injuries correction by glasses must not be considered, but based upon the uncorrected vision which the accident may have caused.

Promptness and accuracy in making reports, giving the full details requested on our blanks, will aid in securing the prompt payment of compensation to the injured workman at a time when he needs it most.

Assuring you of our appreciation for past and future co-operation, we remain

Yours very truly,

INDUSTRIAL COMMISSION OF MINNESOTA,

By JOHN P. GARDINER,

Secretary.

PROCEEDINGS OF THE MINNESOTA ACADEMY OF MEDICINE

Meeting of February 8, 1922

DR. H. L. STAPLES, Presiding

DR. A. E. BENJAMIN presented the following cases:

CASE 1. Gastric Ulcer with Appendicitis. Mr. A. R., age 48, married, carpenter. F. H., negative. P. H., typhoid and diphtheria when young.

Present Illness. Pain in epigastrium past 4 weeks, gnawing in character, comes on 2 hours after meals. Acid foods aggravate. Other foods relieve. Eructations marked. Some pain and tenderness in right upper quadrant, radiating to back.

Examination. Poorly nourished. Two points of tenderness—epigastrium and gall bladder region. Hb. 80 per cent. Stomach acidity—66 total. Urine O. K.

Operation. Oct. 13, 1921. Right rectus incision. Retrocecal appendix removed. Ulcer $\frac{3}{4}$ inch in diameter on posterior wall of stomach, high and near lesser curvature. Gall-bladder normal except for a few adhesive bands. Lymphatics of gastrocolic omentum much enlarged. Stomach opened and base of ulcer cauterized. Abdomen closed in usual manner. Gastroenterostomy not performed because of location of ulcer, its size and possible malignancy.

Convalescence. Vomited once. Otherwise O. K. Gained 40 pounds in 6 weeks.

Present Findings. Feb. 4, 1922. X-ray evidence points to an hour-glass constriction in region of pars media due to old ulcer on the lesser curvature. Motility somewhat interfered with; obstruction not great. Not feeling as well the past two weeks. (Has been working right along.) Appetite not as good as previously. Meat seems to disturb him. Is somewhat constipated, and does not sleep well.

CASE 2. Duodenal Ulcer. Miss E. L., age 42, teacher. F. H., 2 brothers and 1 sister died of tuberculosis. P. H., operation for fibroids 3 months ago. Complete hysterectomy. Duodenal ulcer diagnosed by x-ray and at time of hysterectomy.

Present Illness. Pain in stomach, especially after eating acid foods, past 6-8 years. Has been quite constipated. Past few weeks has been worse. Has vomited several times with relief of pain. Has lost about 10 pounds in last three weeks.

Examination. Some ptosis and enlargement of stomach. 85 per cent retention of motor meal. Hb. 85 per cent. Weight, 114 pounds. Urine negative.

Operation. Feb. 1, 1922. Local, gas analgesia and small amount of ether. Midline incision above umbilicus. Ulcer found obstructing pylorus on duodenal side, great deal of scar tissue. Thought advisable to do a posterior gastroenterostomy. Posterior gastric wall adherent from perigastritis, making it difficult to get at stomach. Stomach was dissected loose and posterior gastroenterostomy performed with Eastman clamps. Inner edges were sewed with linen No. 0 sutures and outer edges with chr. No. 0 continuous (2 rows) with back lock stitch occasionally. Mesocolon stitched around gastroenterostomy just under jejunum. Cigarette drain placed below transverse colon. A rather thin peritoneum was sewed with plain catgut. Fascia and

muscle sewed with chr. No. 1 double. Skin sewed with No. 1 single.

Present Condition. Temperature and pulse normal. Vomited once following operation, but is now taking semi-solid diet.

CASE 3. Duodenal Ulcer, with Membranous Pericollitis and Perigastritis. Mr. H. C., aged 37, laborer. F. H., negative. P. H., quinsy twice—years ago.

Present Illness. For 6 to 8 years. Dull pressure pain in pit of stomach 2 to 3 hours after eating. Food relief inconstant. Never tried soda. Some remissions, but no definite seasonal variation.

X-ray examination elsewhere in 1921, "duodenal ulcer." Operation elsewhere with removal of appendix, separation of adhesions, gave patient relief for two months. Vomited considerably for several days following operation and was greatly distended. Post-operative hernia and thin weak wall resulted. Comparative comfort from liquid or semi-solid foods when well regulated, but aggravated when working, and then vomiting was present.

Examination. Some tenderness in epigastrium. Blood pressure 122/70. Hb. 85 per cent. Urine, sugar, slight reduction, few hyaline casts. Blood chemistry normal.

Operation. Feb. 2, 1922. Ether anesthesia. Incision along old scar just to right of umbilicus, extending about 3 inches above umbilicus. Found ulcer with scar tissue causing obstruction at pylorus; ulcer not active. Adhesions around duodenum, liver and gall-bladder; these were separated and raw surfaces covered. Adhesions, also, extending along anterior abdominal wall for about five inches. Extensive membranous pericollitis—double shotgun barrel arrangement. This was separated and sterile vaseline applied. Great omentum badly adherent down toward mesentery or root of transverse colon. These adhesions were also separated. Patient had a perigastritis at the greater curvature and anterior surface with adhesions. Posterior gastroenterostomy performed. The inner suture was of linen, the outer of No. 0 continuous chromic gut with back lock stitch occasionally. Jejunum dilated, mucous membrane redundant. Angles of gastroenterostomy thoroughly reinforced. Mesocolon stitched in a few places around opening. Cigarette drain placed below transverse colon. Peritoneum sewed with plain catgut, turning edges outward. Muscle and fascia sewed with chromic catgut imbricating rectus muscle. Fascia reinforced with silk worm sutures tied over gauze outside of abdomen.

Present condition: 6 days post-operative. Temperature and pulse normal. Considerable vomiting for 3 days following operation, relieved by gastric lavage. Some hiccoughs. Now taking semi-solid diet with no discomfort.

Discussion by DR. A. SCHWYZER:

The point that the doctor made, that these patients were eating on the 3rd day and making very little trouble, I think is one worth while discussing. It seems to me that if we feed them the proper things we can start feeding soon. In the last two weeks I have had two cases that were up walking about the ward before the week was up. If we give them food that causes no trouble, not too much plain sweet milk, but rather Bulgarian sour milk, they should do well. I have started in giving them this milk (and it probably helps keep the wound sweet inside) and I find that patients are very ready to take it. Setting

them up is a very important point. I once had a patient who vomited for 5 days and I was desperate; thought I might have to operate again to make a free passage, when as a last resort I had her sit up in a chair and gave her an egg, crackers, and liquids, and she stopped vomiting at once. I think it was getting her up in the vertical position that did the work, for, of course, the stomach would then drain better. As to an ulcer on the lesser curvature, that is a rather difficult problem. Is gastroenterostomy going to do any good? In some cases we can see wonderful results. Those are the cases that have a distinct pyloric obstruction. Then a drainage operation, of course, has a chance to do good. I remember one case that was operated on by one of us here a good many years ago and the wound was closed up again because the mass was thought to be an inoperable carcinoma of the pylorus. Then Dr. Dunn operated 6 months later and made the diagnosis of hypertrophic ulcer of the pylorus. Patient was well for 14 years and then came to me in misery. After a barium meal we could see far up on the lesser curvature a niche. When the barium meal had gone by, that niche was still full; 24 hours later it was empty, but, nevertheless, could still be recognized. The pylorus was impermeable and the old gastroenterostomy was nearly closed. A gastroenterostomy was made again and she has been well since that time, which was about 7 years ago. Not long ago I made a wedge-shaped excision of a large saddle ulcer on the lesser curvature and it was rather difficult to sew the parts securely. With cauterizing the ulcer and leaving it at that, without drainage operation, I have had no experience.

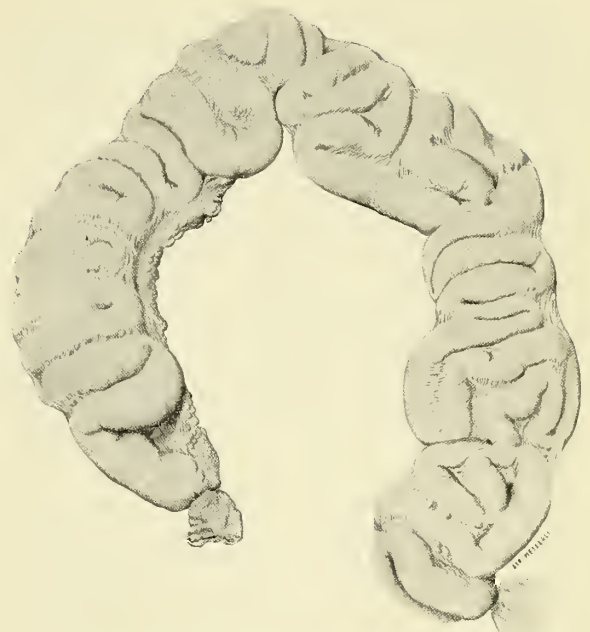
DR. ALEXANDER R. COLVIN gave the following cases:

1. A man, age 72, having previously been unusually well and strong, began to vomit. The vomiting became more and more frequent, so that finally a diagnosis of pyloric obstruction from carcinoma was made. When I saw him he was much exhausted and vomited frequently. Peristaltic waves occurring rhythmically could be seen traversing the stomach region. He had not any pain.

An exploratory incision under local anesthesia was made, and, except for the anomaly of the small intestine which I will show you, the only other finding was an indurated mass at the head of the pancreas. The stomach and duodenum were normal in appearance. At autopsy, 24 hours later, a perforating ulcer of the second portion of the duodenum was found. The base of the ulcer was formed by the head of the pancreas, and there was a good deal of inflammatory thickening around the ulcer region. It is rather remarkable that his symptoms had existed only for about one month, and that the symptom complex was practically that of high intestinal obstruction.

The small intestine of this man, after running in a normal manner for about 18 inches, became fused into a mat about 2 feet long. This terminated at the ileocecal junction. This mat, as I have called it, is composed of U-shaped loops of intestine, with a minimal amount of fatty areolar tissue between the loops. The mesentery proper was very short. I find, in Huntington's Anatomy of the Peritoneum, photographs of the intestinal tract of several lower forms of animal life, in which the intestinal canal conforms more or less closely to the condition in our case.

It is again interesting to note that this man never suffered from the anomaly.



The condition may well lead to speculative thought regarding the symptoms ascribed to kinks, etc., of our intestinal tracts.

CASE 2. A boy, age 7, was run over by an auto truck, and admitted to the City and County Hospital. I saw him about an hour after his injury. He complained of pain and vomited. His pulse and temperature were practically normal. He had a reddened area about 2 inches wide running across his abdomen from above at the left costal border down and to the right landing above the crest of the right ilium. Believing that the probabilities were that a visceral injury was present, the abdomen was at once opened. On opening the abdomen, casual inspection revealed a normal-looking peritoneum. On raising the omentum and transverse colon and exposing the duodenal jejunal angle, the jejunum was found to be completely cut through; one should say, perhaps, torn through. The mesentery of the distal segment was torn off for about 4 inches. The proximal segment was about 1½ inches long, and was denuded in part of its peritoneum.

The rather interesting feature was that practically no blood and no intestinal contents were found in the peritoneal cavity.

An end-to-end anastomosis was made after removing the 4 inches of the distal segment, which had been deprived of its mesentery. This was done with some misgivings, because of the doubtful condition of the proximal segment. At the end of 4 days, continuous vomiting of greenish and greenish black fluid persisted, and it was decided to do a gastroenterostomy. This was done and a catheter passed through the anterior wall of the stomach, down through the gastroenterostomy opening so that he might be immediately fed. He died 24 hours later.

At the second operation, upon inspecting the site of the anastomosis, a small amount of bile-stained fluid escaped, but there had not been any escape up to that time.

While a resident surgeon at the Royal Victoria Hospital, I saw an autopsy on a boy who had been crushed against

a fence by the hind end of a coal cart. There were no external marks of violence, but the jejunum was torn across at the same point as in the case just reported. A further finding was a circular separation of the intima of the abdominal aorta, without demonstrable injury to the external coats of the artery.

A few years ago I saw a young man who had been thrown from a horse, striking his abdomen against a tree. When seen he had symptoms of peritonitis. At operation, peritonitis was found and his jejunum torn through for half of its circumference.

In the first case reported, I fear that if my mind had not reverted to the autopsy seen as an interne, I might have overlooked the condition found because of the absence of any findings in the peritoneal cavity, except the torn bowel. For if a systematic exposure of this particular corner had not been made, the condition could easily have been overlooked.

Regarding the repair of the damage done, I feel that in all probability had the ends of the bowel been closed and a primary gastroenterostomy made, or an anastomosis made between the jejunum and the first part of the duodenum, the boy might have lived. He did not die of peritonitis. He died of exhaustion, or, if you like, a high intestinal obstruction.

Discussion by DR. DENNIS:

This case reminds me of a case I saw some years ago with Dr. Wheaton. It was a case of strangulated hernia. We were surprised to find a mass of small bowel just as this man's, about 8 inches long altogether. Strange to say, that man never had had symptoms before that and never any after. We decided not to free the lesions and he had no trouble whatever.

In connection with the case in which the small bowel was divided, I recall a case at the City Hospital of a boy who was injured in the same manner. I can't recall whether he was operated, but when he came to autopsy it was found that the duodenum had been divided retroperitoneally.

DR. BROWN: I would like to ask if this old gentleman had a large omentum. I have worked with the lower animals and we have found just such a condition in some of them. We found that in animals that have an umbilicus and have the intestinal tract below what corresponds to the navel in humans, that the segment corresponding to the small intestine is oftentimes folded back just as this is here. The mesentery is always short and close to the dorsal wall. As I recall, it occurs usually in long-bodied animals.

It seems to me that this may be a purely congenital thing that may have shown some atavistic tendency.

DR. SWEETSER: I would like to ask Dr. Colvin how long after the injury he operated on the boy. It is interesting to know how long before we would have a relaxation of the bowel.

DR. COLVIN: The boy was operated upon within 2 hours of his injury.

DR. FARR: I would like to mention two points in relation to this case. One point might be illustrated by the case of a boy who jumped off a truck and struck his abdomen against a post. I explored him within two or three hours and found the small intestine cut off, apparently

from having been impinged between his spine and the post. The ends of the intestine had not leaked at all but were contracted down, apparently tight. I looked up the literature at that time and found that many cases of this kind were reported. The gut ends are closed through Nature's effort to prevent leakage.

The other point relates to duodenal cases in which perforation cannot be easily repaired. In a case which I operated upon something over a year ago a thick indurated ulcer had perforated and it was impossible to close the defect. A clamp was placed on the other side of the ulcer and the whole mass quickly excised as the patient's pulse was over 160 and he was cyanotic. A stomach tube was passed and brought out through the pylorus, and moved down six or eight inches into the jejunum. The duodenum was then closed over the tube with a running suture of chromicized gut. This was done under local anesthesia and, although the patient was pulseless from the time of operation at 2 p. m. until 4 a. m. the next day, he made a good recovery. Hot water was poured into the jejunum in fairly large doses and had a marked stimulating effect. The ease with which one may sew the gut over a tube makes this method a great time saver.

DR. H. B. SWEETSER read a paper entitled, "The Management of Prostatic Obstruction."

Discussions by Drs. Dennis, Wright, Farr, Ritchie, A. Schwyzer, Benjamin, Colvin and L. C. Bacon. Dr. Sweetzer closed the discussion.

DR. DENNIS: I think we will all agree with what Dr. Sweetser has said in regard to preliminary preparation. It is very necessary to prevent mortality. One point I want to bring up and that is the question as to whether we shall leave the catheter in after operation. It has always seemed to me that it was a good plan, because the prostatic urethra is very much larger at the time of operation and I make a practice of leaving it in in my cases. I had one case recently in which I did not do it. Later I thought it would be wise to pass a catheter and could not do it. Then tried a sound and could not get that through except by force. Then passed a larger sound. The only explanation that I can see for this is that the prostatic urethra healed in. I should like to hear from some other members as to whether it is a good plan to leave the catheter in. I can understand how it may tend to localize the infection. I am surprised to hear that Dr. Sweetser has had to pack only one case to check bleeding. It seems to me that the best method for holding the packing in place is to use a stiff tube. I was in Mankato recently and asked Dr. Holbrook about this. He told me he made a practice to pass a catheter and attach another tube to it. This gave him an opportunity to irrigate either way and it seemed to me a pretty good plan.

DR. FARR: Dr. Sweetser has covered the subject in such a sane manner that there remains very little to be said.

I have developed a few points which I stand by in handling this class of cases. I have not had a great many of them. Getting the patient into the proper condition is the most important point, I think all will agree. I have had one man of 82 and one of 87, and both recovered. The main point I wish to discuss relates to the anesthesia, and I wish to "take a chew" with Dr. Sweetser when he states that complete anesthesia cannot be obtained when local is used. To my mind this question permits of no argument now, for perfect anesthesia may be established if the

proper technic is used. In fifteen cases we have had one hundred per cent anesthesia in every case. Four ounces of .5 of 1 per cent procain in the caudal canal and a perfect infiltration of the abdominal wall will give perfect anesthesia in practically one hundred per cent of cases.

The acidosis question must be reckoned with in these cases and it is pretty definitely proven that novocain reduces the alkaline reserve less than does any other anesthesia.

I would also like to mention a few points in technic. First, air dilatation of the bladder. We empty the bladder before making a cystostomy, leaving the catheter in situ and attaching to it a rubber tube and bulb. The bulb is allowed to lie between the patient's feet. When the space of Retzius is exposed the bladder is dilated with air, and when the bladder is opened the patient is not deluged with water. We depend upon gravity for dilatation of the bladder after it is opened. The prostatic retractor is introduced from above and the rectal finger is unnecessary. It is surprising to what an extent the prostate can be mobilized above the abdominal wall before beginning its removal. Dissection may be made directly under the eye, as one would dissect tuberculous glands of the neck. We use the urethral catheter after operation only in cases that have used the lying-in catheter before operation, as we fear that it will cause infection unless the patient is accustomed to it.

Referring once more to the kind of anesthesia, I wish to say that although local anesthesia may not be the anesthesia of choice, it cannot be condemned upon the ground that good anesthesia cannot be established.

I would like to ask concerning Dr. Sweetser's experience regarding the accidental opening of the peritoneum.

DR. FRANK WRIGHT: The subject on which Dr. Sweetser has written is one that a man could talk about for three hours. I want to mention a few points. One is the amount of residual urine. Three ounces may back up into the kidney and a man gets constitutional symptoms. One man had a cystitis in which morphin could not control the pain. In certain cases of cystitis morphin aggravates the condition and does not control it, but produces tenesmus. I have always thought that the cystoscope was a dangerous diagnostic instrument to use on an old man. When you try to put a straight instrument through a urethra already curved you do more harm than it is possible to do good. I also had one patient who was catheterized three or four times and died from it. Answering his reference to Dr. Young's statement that the ejaculatory duct is not injured so much by suprapubic as by perineal operation, I would say that the ejaculatory duct is never involved. Many men forget that enucleation of the prostate is a dissection. Regarding the use of anesthesia, I would say that for a long time I used spinal anesthesia and used it very successfully, but gave it up promptly when we discovered that patients were not properly prepared before. If the bladder is drained before, we have no trouble with anesthesia. Regarding packing; the packing should be left in the wound. If it is once put in it should not be taken out but should be allowed to come out itself down into the bladder. I have seen death follow removal of packing. By doing this and taking the tube out in five days the gauze will be found loose in the bladder. The danger from sepsis is very greatly over-estimated. The tubes should be put in tightly to keep

the bed dry and should be left in for five days. If your drainage tube is loose the bed is wet and the patient uncomfortable. If it is too tight and there is pressure necrosis on the bladder you get a wound which heals slowly. The doctor speaks of the healing of the wound. When we enucleate the tumor the sheath will contract, and after healing it will cover with granulation tissue. I think it is unheard of that the walls of the posterior urethra ever unite so don't think it necessary to put in permanent drainage to prevent the urethra healing.

DR. RITCHIE: I think our very great satisfaction in this work has been the selection of the two-stage plan. I am familiar with all the arguments *pro* and *con*, and clinically I know of Dr. Wright's work at the University and have seen his satisfactory results by the use of the interrupted catheterization. I find in our own private work that this preparation very often insures a great deal of distress to the patients. Since we have been doing the two-stage operation we have lost but one case from uremia. In acute retention with bladder distended to fullness, we have often made a plan of doing the work in three stages, by first instituting suprapubic catheter drainage by means of a trocar, then the preliminary wound in preparation for the removal of the gland at the third operation. The first two procedures are done under local anesthesia, are of little consequence, give great relief, and I believe have a mental effect in giving confidence to the patient for the real operation. At the preliminary opening, the peritoneum can be easily misplaced and the dome of the bladder inclined to the front wall, thus minimizing the danger of dissecting the bladder in all directions during the later enucleation of the prostate. It is not always necessary to pack, but if there is any question we use the gauze. I was very glad to hear that Dr. Wright says not to take out the packing too early. We have delayed its removal, maybe sometimes too long. I think the urethral catheter is necessary as it guides the healing. The point is that this catheter must be well into the bladder beyond the prostatic wound. I think that doing the operation in two stages and treating these patients gently has revolutionized our mortality statistics and it will take a lot of argument to make us change.

DR. A. SCHWYZER: First of all, I agree with Dr. Farr that Dr. Sweetser's paper is full of very good judgment and common sense. I think there is not a single thing he said that one could in fairness greatly disagree with. As to the anesthetic, Dr. Farr gave his views that the local anesthetic is the one. However, he combines it with sacral anesthesia. I am very much in favor of local anesthesia. In the last three and a half weeks we have had three cases (one malignant papilloma of the bladder and two of the prostate) and used local anesthesia. Dr. Farr says he injects four ounces into the sacral canal. We used only local anesthesia. It is really remarkable how nicely one can inject around the prostate. We gave one patient about a tablespoonful of ether, more to give him something to think about, but it seems to me that the one spoonful of ether would be preferable to four ounces of anesthetic in the sacral canal. Now as to the handling of the case afterwards. When there is not any oozing to speak of we do not use any packing. Just put in a tube and sew the bladder around the tube and then the tube was removed in two or four days and a catheter inserted through the wound for a few days. One of these cases began to urinate after forty-

eight hours and one of the others after about four days, though they were still draining suprapubically. I think it should not be necessary to wait five days for the removal of the tube in a stereotype manner.

DR. RITCHIE: I might qualify my statement about the gauze. I felt that it should not all be removed at once. One might begin removing it on the second day. It is removed gradually rather than make a separate and complete procedure out of it.

DR. WRIGHT: Regarding the use of local anesthesia, there is no reason why you can't anesthetize the bladder. Regarding the packing, I leave the packing in on the same principles that you pack a wound on the surface. You would wait until granulation tissue had formed and it would come out without force. Hemorrhage comes from the vein, and if you dislodge the clot you start hemorrhage again.

DR. BENJAMIN: This has been a very interesting subject. There has been more disagreement about these cases than about any other. Decompression of the kidney by the catheter has given me better results I think than the two-stage operation. We leave the catheter in for several hours at a time several days beforehand to get the patients used to it. We use local and gas analgesia. Bleeding is checked by suture, as a rule. It obviates the necessity of packing. The catheter is left in afterwards. A suprapubic incision is made and a double tube, one within the other, is placed in the incision. A suture is passed through the inner end of the catheter and brought out between the two tubes and anchored to a cross piece over the short outer tube. It is not uncomfortable, and is a much better way than the old method. It also gives a chance to irrigate the bladder. I have followed this method for the last four years.

DR. COLVIN: Regarding the two-stage operation. It is undoubtedly wise if the patient is suffering from the effects of retention to drain his bladder first, and later remove his prostate. However, not every man who requires prostatic operation is suffering from toxemia or cystitis, and in cases not presenting these features, I see no necessity for a two-stage operation.

Regarding the selection of operative cases, not every man with his first attack of obstruction requires removal of his prostate. A temporary obstruction may be due to congestion and edema of the mucous membrane of the prostatic urethra. If this is relieved by appropriate treatment, the obstruction is relieved and no more trouble may be experienced for several years. If the subject is comparatively young, postponement of the operation is quite safe. If the subject is over 70, a year's relief may be all that his life requires. Apart from the danger of hemorrhage or the danger of operating upon debilitated subjects, there is that rather indefinable danger in genito-urinary operations, perhaps expressed best in terms of "suppression of urine" which is ever a menace in old and young.

The question of packing the wound at the bottom of the bladder. It is my feeling that the packing is efficient just as long as one holds it in place. If after a few minutes' pressure, bleeding is still active, the bleeding point should be sought for and controlled by a ligature or suture.

DR. L. C. BACON: The matter of oozing seems to take up so much attention. I have given up the use of gauze and have found the Pilcher bag very satisfactory. Sufficient

retraction can be made upon the catheter to take care of the oozing very readily and the urethral canal is kept open. I have been using that for several years entirely in place of packing.

DR. SWEETSER (closing the discussion): In wish to thank the members for their very general and free discussion. What I have tried to emphasize particularly is the necessity for preparatory pre-operative treatment if the best results and a low mortality are to be obtained. If the patient is brought to the operating table as a *safe* risk, the details of the operation are not so important, provided ordinary skill is used.

I will comment on only a few of the points brought up in closing. First, about the use of the in-lying catheter. If it is used as the sole source of drainage, the suprapubic wound being closed without a drain, then I think it is not efficient and should not be relied on. If the bladder is also drained through the suprapubic wound, then I think the catheter is unnecessary and may give rise to epididymitis. Stricture does not occur, and, if the patient is to recover the ability to urinate, he will do so whether or not a catheter is left in.

2. Dr. Wright said he had a patient who died from uremia just from passing a catheter. If such a trivial procedure may end so disastrously, how much more certain would be the fatality if a prostatectomy were attempted. Such cases prove the necessity for preparatory care to improve the renal function and eliminate the retained toxic products of metabolism.

3. Concerning the preservation of the ejaculatory ducts, I do not think we need worry, for these old men have usually outlived their procreative period; they may be sterile, but not necessarily impotent.

4. Regarding the drainage tube, the shorter its stay the quicker the fistulous tract will heal. When hemorrhage has stopped and granulation tissue has formed, it ought to be removed; 48 to 60 hours should be sufficient, and then the patient may get out of bed.

5. The question of anesthesia is very important. What I have said about local anesthesia does not apply to experts like Dr. Farr, but to the average man as we see it administered in our visits to the various clinics throughout the country. Further than this, general anesthesia, especially gas-oxygen, produces so little increased danger that I doubt if better results can be shown by even the most skillfully administered local anesthesia. As I have said in my paper, the operation is more likely to be thorough under general than under local, for, as Dr. Schwyzer says, even if the patient does not suffer pain, he gets restless if the operation is unduly prolonged, and this may cause the surgeon to quit before he is finished.

6. It was very interesting to note that everyone who discussed the paper employs the suprapubic method. Ten years ago there would have been no such unanimity. There is no question that the perineal route requires more accurate anatomical knowledge and greater technical skill, and even with these the disastrous sequelæ of fistula and incontinence may not be with certainty avoided.

7. I have not found the two-stage operation often necessary, and surely not the *sine qua non* claimed for it. If an in-lying catheter is tolerated (and it most often is) the patient can be brought into condition for a safe one-stage operation.

8. Accidental opening of the peritoneum is only dangerous when not recognized till after the bladder has been opened and the peritoneal cavity exposed to contamination. This may happen if the opening into the peritoneum is very small. But if its possibility is kept in mind and care exercised, the accident ought to be discovered and repaired before the bladder is opened.

9. Dr. Colvin mentioned that in a first retention where the urine is normal he feels it is safe to go ahead and operate. I would agree with him if he finds the renal function good. He also says that normal urination may be regained following catheterization, and that in such cases prostatectomy is not necessary. With this I cannot agree, as I think it is not possible to completely empty the bladder when the prostate is enlarged. If a sagittal section is made through such a bladder it will be found that the meatus internus is high, forming a cul-de-sac behind and below it. Even with considerable retention, many of these old men will go along and say they have no difficulty in urinating except that they are passing water too frequently. If a catheter is passed, however, there will be found retention, often of many ounces. This is the thing that is liable to trip us.

10. Regarding hemostasis, the Pilcher bag is good, but the difficulty is that you may not have it when needed, and even when you do have it, it may be defective and fall apart. Gauze tape is always available and is efficient. With the bladder widely open and the patient in Trendelenburg position the operative field is easily visualized and hemorrhage may be controlled. It is wise to be sure of your hemostasis before you dismiss the patient from the operating room.

HARRY P. RITCHIE, M. D.,
Secretary.

NEW AND NON-OFFICIAL REMEDIES

During February the following articles have been accepted by the Council on Pharmacy and Chemistry for inclusion in New and Non-official Remedies:

PERSSON LABORATORIES:

Bacillus Coli Antigen (No. 50)-Persson.
Furunculosis Vaccine Mixed (No. 37)-Persson.
Gonococcus Antigen (No. 47)-Persson.
Staphylococcus Aureus Antigen (No. 49)-Persson.
Streptococcus Antigen (No. 48)-Persson.
Pneumonia Vaccine (No. 36)-Persson.

POWERS-WEIGHTMAN-ROSENGARTEN CO.: Novarsenobenzol-Billon.

G. H. SHERMAN:

Whooping Cough Vaccine-Sherman.
Mixed Typhoid Vaccine-Sherman.
Acne Staphylococcus Vaccine-Sherman.

WINTHROP CHEMICAL CO.:

Alypin.

Animal Epidermal Extract Allergens-Squibb.—Powders representing the alkali-soluble protein from the hair and epidermis of animals or from the feathers of fowls. Animal Epidermal Extract Allergens-Squibb are employed for the diagnosis of asthma or perennial rhinitis. The patient's susceptibility may be tested in the same manner as that employed for pollen extracts. They are not intended for treatment. The following allergens have been accepted: Burro Dander Allergen-Squibb, Burro Hair Allergen-Squibb, Cat Dander Allergen-Squibb, Cat Hair Allergen-Squibb, Chicken Feathers Allergen-Squibb, Cow Dander Allergen-Squibb, Cow Hair Allergen-Squibb, Dog Dander Allergen-Squibb, Dog Hair Allergen-Squibb, Duck Feathers Allergen-Squibb, Goose Feathers Allergen-Squibb, Horse Dander Allergen-Squibb, Horse Hair Allergen-Squibb, Rabbit Dander Allergen-Squibb, and Rabbit Hair Allergen-Squibb. E. R. Squibb and Sons, New York (Jour. A. M. A., Feb. 4, 1922, p. 349).

Bacterial Allergens-Squibb.—Protein extracted from bacterial cells. Bacterial proteins have been used cutaneously for the diagnosis of anaphylaxis to the metabolic products from specific bacteria. Their utility is debatable. The following allergens have been accepted: Bacillus Coli Allergen-Squibb, Bacillus Pertussis Allergen-Squibb, Bacillus Typhosus Allergen-Squibb, Bacillus Catarrhalis Allergen-Squibb, Gonococcus Allergen-Squibb, Pneumococcus I Allergen-Squibb, Pneumococcus II Allergen-Squibb, Pneumococcus III Allergen-Squibb, Pneumococcus IV Allergen-Squibb, Staphylococcus Albus Allergen-Squibb, Staphylococcus Aureus Allergen-Squibb, Streptococcus Pyogenes Allergen-Squibb, and Streptococcus Viridans Allergen-Squibb. E. R. Squibb and Sons, New York (Jour. A. M. A., Feb. 4, 1922, p. 349).

Butyn.—Paraminobenzoyl-gammadinormal butylamino-propanol sulphate. It is a local anesthetic proposed as a substitute for cocain, particularly in surface anesthesia, as for the eye, nose and throat. It has the advantage of acting through intact mucosæ almost as effectively as cocain. On the normal human eye, a 0.5 per cent solution of butyn is less effective than a 1 per cent solution of phenacain, but more efficient than a 1 per cent solution of cocain or a 1 per cent solution of eucain. Butyn has been used with success in practically all operations on the eye and in some operations on the nose and throat. Butyn is supplied in solution and also as Butyn Solution, 2 per cent; Butyn Tablets, 0.2 gm., and Butyn and Epinephrin Hypodermic Tablets. The Abbott Laboratories, Chicago.

Solution of Post-Pituitary G. W. Carnrick Co.—An extract of the posterior lobe of the pituitary body of cattle, standardized to have the same strength as liquor hypophysis U. S. P. For a discussion of the uses and dosage see New and Non-official Remedies under Pituitary Gland and Solution of Hypophysis. Solution of Post-Pituitary is supplied in 1 c.c. ampules. G. W. Carnrick Co., New York.

Pituitrin "O."—An extract of the posterior lobe of the pituitary of cattle, approximately 2½ times the strength of solution of Hypophysis U. S. P. For a discussion of the actions and uses see article Pituitary Gland, New and Non-official Remedies 1921, p. 219. Pituitrin "O" is supplied in 0.5 c.c. and 1 c.c. ampules. Parke, Davis and Co., Detroit (Jour. of the A. M. A., Feb. 11, 1922, p. 431.)

Alypin.—The hydrochlorid of 2-benzoxy-2-dimethyl-amino-methyl-1-dimethyl-amino-butane. Alypin is a local anesthetic claimed to be equal to procain, but is not a mydriatic. It is said not to produce disturbance of accommodation and to be less toxic than cocain. But the evidence as to the relative toxicity of alypin and cocain is conflicting. Alypin is used in solutions having about the same strength as solution of cocain hydrochlorid. Winthrop Chemical Co., New York.

Novarsenobenzol-Billon.—A brand of neoarsphenamine. N. N. R. Marketed in 0.6 gm. and 0.9 gm. ampules. Manufactured under license from Les Etablissements Poulenc Freres, Paris, and the Chemical Foundation, Inc. Powers-Weightman-Rosengarten Co., Philadelphia.

Whooping Cough Vaccine-Sherman. — Pertussis bacillus vaccine. (See New and Non-official Remedies 1921, p. 303.) Marketed in 10 c.c. vials. G. H. Sherman, Detroit.

Mixed Typhoid Vaccine-Sherman. — A typhoid vaccine (See New and Non-official Remedies, 1921, p. 310) marketed in 10 c.c. vials, each cubic centimeter containing 1,000 million killed typhoid bacilli and 500 million each of paratyphoid bacilli A and B. G. H. Sherman, Detroit.

Acne Staphylococcus Vaccine-Sherman.—A mixed vaccine. (See New and Non-official Remedies, 1921, p. 314) marketed in 10 c.c. vials, each cubic centimeter containing 40 million killed acne bacilli and 1,000 million killed staphylococcus albus. G. H. Sherman, Detroit.

Bacillus Coli Antigen (No. 50)-Persson.—A colon bacillus vaccine (See New and Non-official Remedies, 1921, p. 299) marketed in 20 c.c. vials, each cubic centimeter containing 1,000 million killed colon bacteria. Persson Laboratories, Mount Clemens, Mich.

Furunculosis Vaccine Mixed (No. 37)-Persson. — A staphylococcus vaccine (See New and Non-official Remedies, 1921, p. 306) marketed in 20 c.c. vials, each cubic centimeter containing 2,000 million killed staphylococcus aureus and 2,000 million killed staphylococcus albus. Persson Laboratories, Mount Clemens, Mich.

Staphylococcus Aureus Antigen (No. 49)-Persson. — A staphylococcus vaccine (See New and Non-official Remedies, 1921, p. 306) marketed in 20 c.c. vials, each cubic centimeter containing 3,000 million killed staphylococcus aureus. Persson Laboratories, Mount Clemens, Mich.

Gonococcus Antigen (No. 47)-Persson.—A gonococcus vaccine (See New and Non-official Remedies, 1921, p. 300) marketed in 20 c.c. vials, each cubic centimeter containing 3,000 million killed gonococci. Persson Laboratories, Mount Clemens, Mich.

Streptococcus Antigen (No. 43)-Persson. — A streptococcus vaccine. (See New and Non-official Remedies, 1921, p. 309) marketed in 20 c.c. vials, each cubic centimeter containing 1,000 million killed streptococci. Persson Laboratories, Mount Clemens, Mich.

Pneumonia Vaccine (No. 36)-Persson.—A pneumococcus vaccine (See New and Non-official Remedies, 1921, p. 304) marketed in 30 c.c. vials, each cubic centimeter containing 8,000 killed pneumococci, Types I, II, III and Group IV, in equal proportions. Persson Laboratories, Mount Clemens, Mich. (Jour. A. M. A., Feb. 25, 1922, p. 581).

PROPAGANDA FOR REFORM

Butyn, A New Synthetic Local Anesthetic.—A committee of the A. M. A. Section on Ophthalmology reports to the Council on Pharmacy and Chemistry on the clinical use of butyn in operations on the eye, nose and throat. The committee finds butyn preferable to cocain as an anesthetic in operation on the eye. One member of the committee also reports favorably on its use in operations on the nose and throat. As a result of the clinical and experimental use of butyn, the committee arrives at the following conclusions: 1. It is more powerful than cocain, a smaller quantity being required. 2. It acts more rapidly than cocain. 3. Its action is more prolonged than that of cocain. 4. According to our experience to date, butyn in the quantity required is less toxic than cocain. 5. It produces no drying effect on tissues. 6. It produces no change in the size of the pupil. 7. It has no ischemic effect and therefore causes no shrinking of tissues. 8. It can be boiled without impairing its anesthetic efficiency (Jour. A. M. A., Feb. 4, 1922, p. 345).

Willard Ealon Ogden, Specialist in Proctology.—Dr. Willard E. Ogden, Chicago, claims to be a specialist in proctology, author of "Improved Method of Treating Rectal Diseases," to have been associated with the leading proctologists of America, and to have developed a method of office treatment which is not taught by any other practitioner. He offers to instruct physicians in his methods. In 1914, Ogden advertised in Chicago newspapers to cure piles. In 1921, Ogden had a copyrighted mail-order course of the treatment of rectal diseases by improved methods. Careful search fails to disclose that Dr. Willard E. Ogden has ever distinguished himself in the practice of specialties in which he now wishes to instruct physicians, that he has never published a paper on any phase of medicine or surgery, or that he has been associated with the leading proctologists of America (Jour. A. M. A., Feb. 4, 1922, p. 368).

Mercuric Cacodylate.—As cacodylates have been found practically worthless in the treatment of syphilis, mercuric cacodylate must be considered as merely an administration form of mercury. It contains but one-half as much mercury as mercuric salicylate. The two preparations cannot be compared with each other as to local or general action for the reason that the cacodylate is soluble while the salicylate is practically insoluble. The cacodylate has to be administered daily to maintain adequate action. Mercuric salicylate is a favorite drug because of the argument that, being insoluble, it forms a depot of mercury in the tissues so that a week's dose may be administered at one time. To keep the patient under as continuous mercurilization as would be secured by the ordinary dose of 0.10 gm. of mercuric salicylate given once a week, six doses of 0.04 gm. of cacodylate would have to be given; in other words, a daily dose excepting Sunday. The pain and induration induced by mercuric salicylate is the price the patient must pay for the convenience of weekly administration (Jour. A. M. A., Feb. 11, 1922, p. 452).

Styptysate Not Admitted to N. N. R.—Styptysate, according to the advertising of Ernst Bischoff Co., Inc., is "obtained by dialysis from Bursa Pastoris (Sheppard's [sic] purse)." It is claimed to be "The Remedy for Hemorrhages," to be "Superior to Ergot and Hydrastis," "of particular advantage in Menorrhagia and Metrorrhagia" and to have been "found of great value in vesicle hemor-

rhages and hemorrhages from mucous membranes in general." According to the label, Styptysate is "made in Germany," but the name of the German manufacturer is not given. According to German publications, a proprietary called Styptysate and made from shepherd's purse—a common weed—was used in Germany as a substitute for ergot when this drug was not obtainable. On the assumption that the product discussed in German publications is the Styptysate marketed in the U. S., the best that can be said for it is that, during a shortage of ergot, it was used in place of that established drug. The Council on Pharmacy and Chemistry reports that Styptysate (Ernst Bischoff & Co., Inc.) is inadmissible to New and Non-official Remedies because its composition is semisecret and indefinite, and there is no evidence that its uniformity and strength is controlled; further, it is inadmissible because the therapeutic claims advanced for it are exaggerated and unwarranted and because there is no evidence that it possesses any advantage over established drugs, such as the biologically standardized fluid extract of ergot or the definite ergot preparations admitted to New and Non-official Remedies (Jour. A. M. A., Feb. 11, 1922, p. 450).

Iron Therapy.—Iron has so long been administered in some form or other in the treatment of anemia that one might well suppose that its function in the regeneration of blood had been clearly determined. This is far from being the case. Last year, Whipple, and his associates, reported that iron given as Blaud's pills had no influence on the rate of blood regeneration in secondary anemia produced in animals. They reported that there is some experimental evidence for the administration of blood in secondary anemia, but state that whole red cells or hemoglobin given by mouth in the form of a dry powder do not appear to influence profoundly the blood regeneration curve. Their experiments show that hemoglobin has a distinct influence on blood regeneration, but not sufficient to warrant its use in uncomplicated secondary anemia in view of the favorable action of meat and other diet factors. Musser has studied the effect of inorganic iron in a type of anemia representing more closely what is seen in clinical medicine. He found that ferrous carbonate failed to produce any alteration of the experimental hemorrhagic anemias. All of the more recent evidence indicates that the iron is of paramount importance in red blood cell regeneration (Jour. A. M. A., Feb. 18, 1922, p. 512).

Urotropin was removed from the list of articles accepted for New and Non-official Remedies because Schering and Glatz, Inc., refused to place the U. S. Pharmacopeia name hexamethylenamine (hexamethylenamina) on the label and in its advertising so as to make clear to physicians the identity of the product, and because it was sold under therapeutic claims which the Council held unwarranted. An advertising pamphlet sent to physicians in 1921 contains a number of unwarranted statements; particularly objectionable are the claims made for the use of Urotropin as an antiseptic in body fluids that are alkaline, such as the cerebro-spinal fluid, bile, aqueous humor of the eye, saliva, the excretions caused by middle ear infection and other excretions of the nasal, bronchial, laryngeal and mucous membranes. The lack of efficacy of hexamethylenamine in alkaline secretions is generally admitted, and the clinical references to the use of hexamethylenamine in the pamphlet are obsolete. In the introduction to the pam-

phlet, Schering and Glatz state that they are well acquainted with the scientific research work discrediting the efficiency of hexamethylenamine in non-acid media, but that they feel that the accumulated evidence for its efficacy in such conditions should not be "brushed aside." However, the pamphlet is not made up of quotations, but of unqualified statements. With one exception, all reference to the antiseptic properties of the drug in alkaline media are previous to 1913, that is, before the importance of reaction of the medium was fully appreciated. To quote these earlier articles, without regard to the later work which, in most eyes, discredited them, constitutes in effect an exploitation of this brand of hexamethylenamine under unwarranted therapeutic claims (Jour. A. M. A., Feb. 18, 1922, p. 531).

Bio-Chemic Laboratories' Products. — The Bio-Chemic Laboratories, Chicago and Los Angeles, send out the following advertising:

1. "Salvarsan and Mercury without the Needle." In this pamphlet the use of Salv-Absorbs and Merc-Absorbs, preparations for the rectal administration of arsphenamine and mercury, respectively.

2. "Something New in Glandular Therapy—Caplets." This circular declares that "Caplets make possible the preparation of any pluriglandular combinations in your office. * * * Your office girl can make them up for you."

3. "Why Gland Transplantation?" A circular devoted to "Orch-Absorbs" which is said to be "a preparation of interstitial glands for intra-rectal administration." No preparation of the Bio-Chemic Laboratories has been accepted for New and Non-official Remedies. The Council on Pharmacy and Chemistry, however, has published a report on another proprietary form of administering arsphenamine by rectum. This brings out the lack of evidence for the efficacy of this method of arsphenamin administration. The pluriglandular "Caplet" medication is a form of shot-gun therapy that has been the subject of a report of the Council on Pharmacy and Chemistry and has been discussed editorially (Jour. A. M. A., Feb. 25, 1922, p. 603).

PROGRESS

Abstracts to be submitted to Section Supervisors.

MEDICINE

SUPERVISORS:

F. J. HIRSCHBOECK,
FIDELITY BLDG., DULUTH
THOMAS A. PEPPARD,
LA SALLE BLDG., MINNEAPOLIS

AN ANALYSIS OF ONE HUNDRED AND EIGHTY CASES OF CANCER OF THE STOMACH WITH SPECIAL REFERENCE TO THE INCIDENCE OF PRE-EXISTING ULCER: S. Paul Taylor and T. Grier Miller (Am. Jour. Med. Sc., p. 862). The cases were divided into two groups: (1) Those giving a clinical history suggestive of pre-existing ulcer, and (2) those of a progressive downward course without previous symptoms.

A history suggestive of pre-existing ulcer was obtained in only 17 per cent, and the authors conclude that it does not seem probable that the true incidence of such a pre-existing lesion exceeds these figures. Epigastric pain was referred to the back in 29 per cent of the cancers of the pylorus, and of those with reference of pain to the back 80 per cent had pyloric involvement. The apex of the age incidence for the onset of "ulcer" symptoms in the ulcer-before-cancer cases was two decades later than it was in 79 ulcer cases. From this they conclude that ulcers first giving rise to symptoms in middle life are far more liable to become malignant than are ulcers generally, or that the ulcer-before-cancer cases are really malignant from the beginning, and that prompt and radical surgical treatment of all patients first developing symptoms suggestive of ulcer after forty years of age is justified and indicated. Pyloric cancer is associated with definite retention but the free hydrochloric acid and total acidity findings are not abnormally low. Retention does occur in cancer of the lesser curvature. When the cancer was situated elsewhere retention did not occur but the acid findings were distinctly low. A positive diagnosis was made in 96.8 per cent by Roentgen study. At operation the tumors were more extensive and involved the lesser curvature often than the Roentgen ray suggested. Of patients with cancer of the stomach who now come to the surgeon, about one-third are given a chance of cure by radical operation, one-third are treated palliatively, and for one-third nothing can be done.

PAUL A. ROWE.

THE PROGNOSIS OF INVOLUTIONAL MELANCHOLIA—AUGUST HOCH, LATE DIRECTOR PSYCHIATRIC INSTITUTE, NEW YORK STATE HOSPITAL: John R. MacCurdy, New York (Arch. Neur. and Psych., Jan. 1922). "Involutional Melancholia" is probably the most widely known of mental ailments. This condition, until 1907, was recognized as a clinical entity. Dreyfus in 1907 was the first to call attention to the frequent recoveries though many times late and also to the fact that in many of its clinical features there was a resemblance to manic-depressive psychosis.

In this contribution a series of sixty-seven cases are analyzed. The final outcome was determined in all except one case. Age, previous attacks, emotional state and other apprehensive ideas, self accusatory ideas, unreality negativism, hypochondria, erotism, irritability, sexuality, ideas of poverty and sleep are noted for each case in a detailed tabulated form.

Forty-three of these cases are separately classed as benign (recovered) and four as doubtful. In the benign melancholias marked emotional reaction, anxiety with restlessness and delusions of poverty and death were the rule. Their average duration was nine and one-half months. Recovery occurred in from four months to six years after onset. In the malignant melancholias on the other hand hypochondria was prominent; this symptom occurred in but a sixth of the benign cases. Anterorism was present in the majority of cases. Peevishness, diminished interest,

tendency to seclusiveness and surliness were the rule. Ideas of poverty and death were present in this class in the same proportion as in the recovered group. Ridiculous hyperchondriacal ideas usually concerned with the alimentary tract feature in the unrecovered cases.

Presence of symptoms indicating bad prognosis ordinarily may, however, be present for a short period at menopause in the benign forms and not vitiate recovery.

The authors feel that the recovered cases may be regarded as having essentially the same basis as manic-depressive psychoses. Unrecovered should be classed as regressive psychoses, apparently belonging to the dementia precox group. Recovery in the former group usually seemed hastened after discharge from the hospital.

J. C. MICHAEL.

SOME EXPERIENCES WITH THE MELTZER-LYON METHOD OF DRAINING THE BILIARY SYSTEM:

Anthony Bassler, William Henry Luckett, and J. Raymond Lutz. (Amer. Jour. of Med. Sc., Nov., 1921.) The authors have made a comprehensive study of the Meltzer-Lyon method of draining the biliary system and their findings on the whole distinctly controvert those of the original writers. Meltzer's law of contrary innervation was not proved nor accepted by the writers. They doubt any specific action on the part of the magnesium sulphate solution as causing a relaxation of the sphincter of oddi and contraction of the gall bladder. They have ascertained that various substances will produce the same effect if subjected to experimentation. hydrochloric acid, of very low potency, yielding the same characteristic bile as magnesium sulphate. The argument is directed chiefly toward the nature of the so called "B" bile of Lyon, the deeper color of which they believe is due to oxidation and not to concentration in the gall bladder. The increase in the specific gravity as noted by Lyon is believed by them to be difficult to evaluate with certainty, on account of the content of magnesium sulphate in the duodenum and in the bile itself, through resorption in the portal circulation and excretion by the liver. They question the dependability of the bacteriologic and cytologic findings in the "B" bile as conclusive of gall bladder infections, as in their opinion they are chiefly due to duodenal and gastric contamination. They believe the most important function of the gall bladder to be to relieve pressure within the biliary system, as a protective measure for the pancreas rather than as a reservoir for bile in digestive way, and think that Meltzer and Lyon deduce too much reasoning from the anatomy and relationship of the gall bladder rather than its function. They have also proved, as have others, notably Dunn of Omaha, that a cholecystectomized individual shows the characteristic "B" bile shortly after operation before the ducts have a chance to dilate. The crux of the argument seems to lie in this latter factor, and seemingly would be most difficult to refute. Lastly, the writers believe that the method is a poor substitute for surgery, and that its field of usefulness is exceedingly limited, probably only at the most as a temporizing means.

F. J. HIRSCHBOECK.

SURGERY

SUPERVISORS:

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THE SURGICAL TREATMENT OF ACUTE PELVIC INFECTIONS IN WOMEN: F. G. Dubose. (Surg., Gyn. and Ob., Sept., 1921. Page 299-307.) It is estimated that seventy-five per cent of invalidism in women arises from pelvic infection. The author urges earlier and more radical operative treatment in this disease, especially in acute exacerbations and in the primary attack.

Recurrence of pelvic abscess after drainage through the cul-de-sac has been the rule; such procedure draining but one of the many pus pockets in the pelvis.

The author is prompted to do very radical surgery in these cases instead of waiting and adds that however much the cul-de-sac is bulging with pus, the patient is operated upon through a medium lower abdominal incision, so that all the diseased tissue can be examined and treated surgically.

Pus pockets by no means regularly become sterile. Years are prompted to do very radical surgery in these cases instead of waiting and adds that however much the cul-de-sac is bulging with pus, the patient is operated upon through a medium lower abdominal incision, so that all the diseased tissue can be examined and treated surgically.

The greatest error in the operative treatment of these cases is insufficient surgery and inadequate drainage. The author believes that the morality and morbidity following the non-operative, the expectant plan, and the conservative-surgical is frightful.

The author's plan for the treatment of these cases follows: Immediate operation is done on all cases which present the syndrome of acute surgical pelvis, if first seen within twelve hours after the onset of the infection. If first seen twelve or more hours after onset a varying period of some hours of observation is followed, during which time absolute rest is given the patient, as compatible as possible with the routine and repeated examinations. During this time the most minute and painstaking examinations are made to determine the general condition of the patient. These examinations include blood count, bacterial examination to determine the type of organism one is combating, and any others that may throw light on a remote or complicating disease such as the x-ray and cystoscopic examination. During this time the patient is supported by proctoclysis and hypodermoclysis of saline solutions containing glucose. In the most acute cases, if seen before the eighth day after the onset, the author advises deferring of operation:

1. If the condition is apparently stationary or the symptoms take a more favorable turn during the six or twelve hours consumed in the preliminary study of the case;

2. When the blood examination reveals a high polymorphonuclear count without an accompanying leucocytosis or in the absence of an increasing number of leukocytes;

3. From the third to the seventh day after onset—

when the severity of the peritonitis is at its height and the rest method is being given a chance to have effect—than the operation should be withheld in the absence of an exigency until the more acute general symptoms have subsided.

Do not defer operation:

1. In the presence of a progressive exaggeration of unfavorable symptoms during the period of rest, observative and expectant treatment;

2. If there is sudden relief of pain with a subjective sense of improvement, accompanied by an acceleration in pulse rate and frequently by a lowering temperature, usually indicating thrombosis or rupture of a localized abscess;

3. When there is a sudden fall in a previously high leukocyte count or a decreasing number of leukocytes and an increasing percentage of polymorphonuclears, which indicates a falling resistance;

4. When more than a week has elapsed since the onset of the infection, for the blood during this period of time will have developed, in all probability, a degree of immunity to the limit of its opsonic power;

5. When a mass appears in the pelvis—evidence of the localization of the infectious process by adhesions within a circumscribed area.

The technique of operating on cases of pelvic infection is given by the author, who lays special stress on certain features.

Pelvic débridement is urged, at least the pyogenic membranes with infected tubes, uterus and ovaries should be removed.

Gauze packs are applied over denuded pelvic surfaces to stop oozing and to hinder capillary absorption. Eroded or denuded intestinal surfaces are peritonized or overlaid with omentum. Rubber dam covers the gauze packs and the pelvic operative field, minimizing the formation of adhesions and draining freely and continuously.

In 255 pelvic inflammatory cases operated upon consecutively there was one death. One hundred and sixty-three have been followed up, of which 137 or 84 per cent are cured; 18 or 11.1 per cent are improved; 8 or 4.9 per cent not improved.

Average hospital days 23.3, including one neurotic, who spent 109 days in hospital. Case reports, tables of one hundred and six—three cases whose post-operative course has been followed and an axiomatic review in parallel conclude the article.

FRED R. SANDERSON.

Cysts of the Pancreas. E. S. Judd. (Minnesota Med., Feb. 1921.) Most investigators agree that true cysts of the pancreas originate in the substance of the gland and are due either to intermittent or permanent obstruction to this outflow of pancreatic secretion. Pancreatitis is always associated, but it is difficult to determine whether or not the inflammation is an etiologic factor in the formation of the cyst or is a result of the cyst. Archibald contends that pancreatitis may be the result of bile entering the pancreatic duct, and that the cysts are caused by pancreatitis. Judd failed to find bile in any of forty-

one cysts operated on. The presence of bile would not prove it to be an etiologic factor, unless it could be shown that there was no communication between the cyst and biliary system. Injection of bile into the pancreatic ducts of animals causes pancreatitis, but cysts form in a very small number of these cases.

Cystic tumors of the pancreas rarely become malignant. Hyatid cysts of the pancreas are rare even in countries where they are common in other parts of the body. A few cases have been reported of congenital cystic disease of the pancreas associated with congenital cysts of the kidneys and liver. Hemorrhage into the tissues of the pancreas frequently occurs with the resulting formation of a cyst.

The author reports a series of forty-one cases from the Mayo clinic. In thirty-eight cases operation was performed for the cysts and in three cases the cysts were discovered during operation for some other condition. It was often difficult to locate the cysts with relation to surrounding structures and to determine whether they were true or so-called pseudo-cysts. In only two cases were the tumors malignant or associated with malignancy of the pancreas.

According to Korte trauma is a definite factor in the etiology in about 28 per cent. It was a factor in but one case of the author's series.

The walls of pseudo-cysts which may form in the substance of the pancreas as the result of degeneration, are very thick and composed of fibrous tissue with no epithelial lining. They present higher in the abdomen than do the true cysts, and are not so closely attached to the pancreas; tissues are usually so densely matted that it is difficult to establish the relation to approximating structures. According to Opie the formation and enlargement of pseudo-cysts are due to the irritating products of the pancreas. This formation has also been ascribed to a collection of fluid in the lesser peritoneal cavity. The fluid contains epithelial cells, fat, sometimes bile, crystals, blood cells, and necrotic tissue. One or more of the pancreatic enzymes is usually present.

Pancreatic cysts usually occur in persons of middle age although several cases have been reported in children of a few months, and in persons more than 70. In the Mayo Clinic series, there were twenty-four females and seventeen males, the usual preponderance of females. The tumor presents as a rounded or oval semi-fluctuating mass at the umbilicus, in the midline above it, or just to the left of the midline. The size varies greatly. The cyst is usually fixed, although when it arises near the tail of the pancreas, it may be movable. A pancreatic cyst rarely presents on the right side of the midline. As it enlarges it extends forward, coming in contact with the anterior abdominal wall, often crowding the stomach upward and the colon downward; it may present between the two behind the meso-colon or between the layers of the transverse meso-colon.

The symptoms are due to pressure on adjoining organs. Pain is nearly always present. Large tumors press on the stomach causing indigestion and vomiting; loss of weight is often considerable; and jaundice is usually absent. Glycosuria and diabetes apparently follow severe chronic pancreatitis. Osler collected 134 cases; only nine of the patients had associated diabetes. In Judd's forty-one cases the time of onset of symptoms varied from three

weeks to twenty-five years. The frequency of associated gall-bladder disease was a striking feature. Two patients had diabetes at the time of operation for the cyst, both died in about one year in diabetic coma. One other patient developed diabetes after the operation and four patients had sugar in the urine.

The ideal form of treatment is complete enucleation from the pancreas and surrounding structures but because of its intimate attachment, this is often not feasible. Bleeding is always pronounced and diabetes may result, if too much of the pancreas is removed. It is often advisable to drain the fluid after the wall of the cyst has been sutured to the parietal peritoneum, or after packing with gauze to protect surrounding structures. Drainage is usually prolonged and may be very irritating to surrounding tissues. It continues until the mucous membrane lining has been completely destroyed. In some instances, the cysts are multiple and two or more operations are required. Wherever it is possible, it is advisable to strip out any mucous membrane lining that can be removed without danger of hemorrhage. The more radical procedures seem to shorten convalescence. In this series patients in whom drainage was instituted seem to recover as completely as those from whom cysts were removed. Most of the wounds drain for several weeks, some for months, and a few have been reported to have drained for years. In the forty-one cases there were no deaths from the operation.

V. C. HUNT.

GYNECOLOGY AND OBSTETRICS

SUPERVISORS:

ARCHIBALD L. McDONALD,

FIDELITY BLDG., DULUTH

ALBERT G. SCHULZE,

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THE SIGNIFICANCE OF THE PELVIC OUTLET IN PERINEAL LACERATIONS, CYSTOCELE AND PROLAPSE: Arthur Morse. (*Amer. Jour. Ob. and Gyn.*, Vol. 2, No. 2.) The author goes over the records of 100 cases that presented themselves at the Woman's Clinic at Yale for operative relief of perineal lacerations, cystocele or prolapse.

His object is to determine if there is any connection between the size of the pelvic outlet, method of delivery and the damage sustained, if any.

Of these one hundred pelves, 79, or 80 per cent, would be regarded as normal. Of this number, 60, or about 75 per cent had a cystocele or prolapse of which 40 per cent had been forceps deliveries. Of the remaining 19, or 25 per cent, there were perineal lacerations without the other injuries and of these 21 per cent were forceps deliveries.

Twenty-one of the 100 were funnel shaped and of these one-third had injury to the anterior pelvic segment and two-thirds had perineal damage calling for a repair.

The explanation is this: A normal sized outlet allows the occiput to be delivered close under the pubic arch thus saving the perineum but at the expense of the soft structures in the anterior segment. A funnel pelvis forces

the head posteriorly at the expense of the perineal structures but without damage to the anterior segment. In a forceps delivery our desire seems to be to save the perineal structures without commensurate regard for those at the anterior segment.

This is worthy of gynecologic consideration for he states that mensuration of the pelvic outlet should be employed in the pre-operative examination of women still in the child-bearing period who present themselves for a secondary repair of perineum and the type of plastic procedure should be adopted to the type of outlet in the particular case.

ALBERT G. SCHULZE.

NAUSEA AND VOMITING IN PREGNANCY: Victor John Harding. (London *Lancet*, Aug. 13, 1921.) This is the writer's second paper on this subject, the first one appearing about two years ago, written jointly with J. W. Duncan.

The primary etiological factor in this condition is first the state of pregnancy itself and imposed on this a period of starvation of longer or shorter duration resulting in a deficiency of glycogen in the liver, followed inevitably by a fatty infiltration.

There is a minor periodicity determined by the fasting hours of the day. The longest period being the night has given rise to "morning sickness."

There is also a major periodicity covered by the first trimester of pregnancy and the writer explains it by the parasitic life of the fertilized ovum and the formation of the placenta both of which are accompanied by a period of nitrogen loss. This is termed "physiologic vomiting of pregnancy."

Formation of the placenta offers the greatest maternal glycogen drain as it functions as a glycogen storer for the fetus. With placenta formation complete, a glycogen equilibrium is established, the fatty infiltration disappears and with it the vomiting.

Those cases that fail to cease vomiting at the fourth month are explained as being due to failure on the part of the placenta and maternal liver to reach a glycogen equilibrium. As secondary etiological factors, not as complications, the writer mentions intestinal intoxication and neurosis.

Treatment consists of a high carbohydrate diet taken in small amounts and at short intervals. Fluids to overcome the dehydration. If vomiting defeats oral feeding, rectal feeding in the form of 6 to 8 ounces of a 5 or 10 per cent glucose solution is resorted to. Bromides are useful.

Intestinal putrefaction and neurosis must not be overlooked.

In the mind of the writer the pernicious type is explained by the above glycogen deficiency and supported by the work of Underhill and Rand.

ALBERT G. SCHULZE.

CONTRIBUTION TO THE STUDY OF THE RELATION OF SYPHILIS AND HYPERTROPHY OF THE OMENTUM: Edmond Levy-Solal. (*Gyn. et Obstetrique*

Tome IV, No. 2.) This article reviews the French work on the subject beginning with that of Pinard in 1891, who first affirmed the hypertrophic influence of syphilis on the placenta. This investigator gave the ratio of the weight of the syphilitic placenta to that of the fetus as 1 to 4. This work has not been universally accepted and there are many apparent exceptions, associated with recent infections, hereditary and latent forms, influence of treatment, and variations at different stages of pregnancy. There are many factors in the problem and some consider a ratio of from $\frac{1}{6}$ to $\frac{1}{4}$ of the fetal weight as physiological and not specific.

The conclusions of this article are based on work done in the Baudoloue Obstetrical clinic and the associated syphilitic dispensary. The results are presented from two standpoints: 1st, hypertrophy of the placenta in relation to syphilis; 2nd, undoubted syphilis in relation to hypertrophy of the placenta. Of 176 cases of definite hypertrophy of the placenta, 99 or 56 per cent were from patients who showed undoubted evidence of syphilis, 41 were suspicious and 28, were definitely excluded.

There were 97 cases of pre-existing syphilis in which the diagnosis was made by the history or the Wassermann. Fifty-seven of these showed marked placental hypertrophy, while 40 showed a placenta within normal relations. Pre-existing syphilis, untreated, causes placental hypertrophy in the majority of cases. Active treatment with arsenic limits this influence. Florid syphilis is associated with placental hypertrophy unless actively treated early during pregnancy. Syphilis contracted during pregnancy causes such hypertrophy, in about one-fourth of the cases and the effect is most marked in those contracted early, and untreated.

Active treatment during pregnancy tends to prevent hypertrophy of the placenta.

ARCHIBALD L. McDONALD.

BACTERIOLOGY AND PATHOLOGY OF FALLOPIAN TUBES REMOVED AT OPERATION: Curtis. (*Surg., Gyn. and Ob.* Vol. 33, No. 6.) This report is based on a clinical, bacteriological and pathological study of 300 patients, and 192 specimens. In previous papers, the author has brought out the fact that the primary lesion was in the cervix, that dilation and curettage often caused extension, and that the ordinary Stumpp amputation did not always remove the entire infected area.

Gonorrhoeal infection was diagnosed definitely in 70 per cent of the cases and 10 per cent more were probably due to this infection. Positive cultures were developed from 19 of 64 cases which presented gross inflammatory lesions, but only in those which had showed fever or leucocytosis within two weeks. He assumes that the tube does not remain as an active focus of the disease, and that recurrent attacks represent reinfections from other foci, i. e., cervix.

Gross pathology: The adhesions are usually comparatively easily broken down. The ampulla of the tube is swollen and congested, the fimbria closed by fusion or adhesions. Massive induration is usually the result of repeated attacks.

Microscopically: The blood vessels are enlarged, occasionally with hemorrhage into the tube, the epithelium is swollen and destroyed with fusion of the villous folds, there may be buried masses of gland epithelium, the stoma contains blood cells; polymorphonuclears, lymphocytes, and particularly plasma cells. The persistent characteristic findings are increased blood vessels, and fusion of the villi.

Non-venereal tubal infection involves surrounding structures: dense peritoneal adhesions, perisalpingitis, with marked infiltration of the muscle and submucous coats. The fimbriated ends are more often patulous. Inflammatory reaction in the mucosa is less prominent, and less adhesions exist between the villus folds.

Tuberculosis of the tubes was present in 5 per cent of all cases where general abdominal tubercular peritonitis was excluded. Less than half could be diagnosed without microscopic study. Dense adhesions indicate repeated attacks. The walls are indurated, fimbria adherent, and the lumen distended with caseous contents.

The mucosa is hyperplastic with adhesions between the villi, and destruction of epithelium. There is infiltration with round cells, tubercle formation with giant cells.

ARCHIBALD L. McDONALD.

PEDIATRICS

SUPERVISORS:

FREDERICK C. RODDA.

CHILDREN'S CLINIC, MINNEAPOLIS

ROY N. ANDREWS,

MANKATO CLINIC, MANKATO

COMMON NERVOUS CONDITIONS OF CHILDREN:

R. S. Miles. (*Arch. of Ped.*, Oct., 1921.) By the common nervous conditions of children, the author refers to the type of patient seen from day to day, presenting no definite pathologic lesion as far as one can discern, but a child who reacts abnormally to any form of stimuli, and whose reaction is out of proportion to the existing cause.

Realizing that neuroses causes more suffering among the human race than any other ailment, and that perfectly balanced, emotionally stable adults are no longer the rule, the necessity for the early recognition and proper appreciation of the importance of the nervous state of the infant or young child can not be emphasized too much.

It is true that the inhibiting function of the brain is not at its maximum in infancy, while the irritability of the peripheral nerves reaches a high grade of development early in life. As a result, we have an unbalanced condition for a considerable period of time, which is, no doubt, responsible for many of the peculiar nervous manifestations seen during the period of infancy and even up to the third year of life.

The nervous child, as we observe, presents, as a rule, one of two types of what we call temperament, or disposition. It is characterized either by hypersensitive and exaggerated responses to any form of stimuli, either physical or mental, as shown by the increased tendon reflexes, convulsions, ties, etc., or by the opposite manner of reacting, being depressed, melancholy and extremely re-

served. These types are not so clearly defined during the period of infancy as they are in later childhood. With the infant, we meet disturbances of digestion, fretfulness, convulsions, delayed dentitions, vomiting, and restlessness. As the infant passes on to childhood we observe symptoms no less pronounced, but of a different nature; namely, disturbed sleep, night terrors, enuresis, perversities of appetite, restlessness, etc. Unless these are corrected we have them intensified as he advances into puberty and adolescence, at which time they assume more definite organization in the various forms of neuroses.

Nervous disorders of older children rarely appear suddenly. They are the end results of many contributing factors which have their origin prenatally or postnatally. Important among the causes of the nervous conditions of the child is to some extent his inherited lack of mental stability, but much greater is the influence of his environment. It is hard to make the parents realize this. Fatigue no doubt ranks more closely to inheritance as a cause for nervousness than any of the rest of this group. It is brought about by too close confinement as well as too great indulgence in activity. In the poorly regulated homes, there is little or no attention paid to sleeping or resting hours.

When the child arrives at the school age, he faces new problems which bring about conditions peculiar to that age, and these conditions bear heavily upon him. He readily tires of the schoolroom routine, and improves quickly when allowed the freedom of out-door life. These children are very emotional and become easily terrified, their power of imagination is very great, and they are inclined to fret a great deal.

As the child approaches maturity and his brain cells become more stabilized, then is the proper time to allow a heavier load applied gradually. If these stages of development are disregarded, as they are in many of our modern school and home methods, we create an aversion in the mind of the child toward his studies, and he is a failure for this reason. The author states that nutrition of the proper kind is one of the first requirements in restoring and maintaining a healthy nervous balance. Second, long hours of rest are necessary to allow for repair and the storing up of energy. These two features alone, if properly applied, will in most instances meet the requirements of the nervous child.

The physician must be the monitor in the home, otherwise it is futile to attempt to secure satisfactory results.

No part of the child's physical makeup should be overlooked in the treatment of the nervous disorder. His life should be regulated so that he develops symmetrically: his muscle and bone tissue need as much attention as does his brain tissue. He should be allowed to live as near to nature as possible.

R. N. ANDREWS.

THE ABDOMINAL PAIN OF THROAT INFECTIONS:

Joseph Brennemann. (*Amer. Jour. of Dis. of Child.*, Nov., 1921.) The paper directs attention to the symptom that is of very frequent occurrence and which has so far as the author knows, received little if any attention in the literature. The symptom referred to is that of abdominal pain

occurring often to the exclusion of all other subjective symptoms, in the course of throat infections in children. By throat infections, is meant the whole series of upper respiratory tract infections from the common cold to a fatal septicemia. Many patients will complain of abdominal pain at the beginning or after the acute manifestations in the throat; often they complain of nothing else, for it is a well known fact that children only exceptionally complain of the throat itself. The nature and the location of the pain are fairly constant and the time of occurrence vary much in the different individuals. Sometimes it apparently lasts for weeks and even months after all other symptoms have disappeared. It may be more or less constant or intermittent. The abdomen is only exceptionally distended and tenderness is often absent and nearly always less marked than unelicited pain. The child will usually point to the region of the umbilicus when asked to indicate where the pain is.

As to the cause of this pain, one can only conjecture. In children of three or four years, I believe the abdominal pain is often due to nausea. The author is convinced that in the causation of these abdominal pains of throat infections, indigestion, myalgia, grippy aching, neuritis, or any other referred pain from the thorax, or from the vertebrae column carried along the intercostal nerves, play no part. In the pain that usually occurs during such an infection, that lasts for some time, and even outlasts the other evidences of the original infection, the author believes that the cause will be found in the mesenteric and retroperitoneal glands.

In a recent paper on abdominal pain in children, Hutchinson emphasizes the importance of enlarged glands in the causation of abdominal pain in children, but he does not relate them to throat infections. The pathogenesis of such enlarged glands is again a matter of speculation. Two routes of infection are possible; by the blood stream and by direct transmission. The latter is most plausible. We are dealing with organism that invade the mucous membrane of the throat, and other adjacent mucous membranes and it is at least possible that they have a similar action on the intestinal mucous membrane. They are undoubtedly swallowed in enormous numbers, and it is by no means proven that they cannot pass the stomach without losing their virulence.

The true cause of the pain may be, a localized enteritis or colitis. That the glands might become involved secondarily, even to the point of abscess formation, or might be enlarged for a time after the intestinal lesion is healed, is quite probable. While our interests in the pathogenesis of this pain may be purely speculative, it is of practical value from a diagnostic standpoint to know that there is such a pain, and be familiar with its clinical setting. Throat infections may cause abdominal pain resembling appendicitis and this, especially, requires a very careful differentiation. We know that pain in the right lower quadrant in children is very often not appendicitis, and when this pain is accompanied with the throat infection and not accompanied with much tenderness or rigidity, we are often justified in ruling out appendicitis but we must remember that appendicitis does occur in children and if such, it has to be recognized and promptly taken care of.

R. N. ANDREWS.

STUDIES OF INFANT FEEDING: Alfred Bosworth. (Amer. Jour. of Dis. of Child., Dec., 1921.) It is quite generally held that the presence of hard protein curds in the stools from bottle fed infants is indicative of a faulty digestion of the casein fed in the modified cow's milk formulas. Such a view seems to confuse the issue, placing on the baby a fault which should be borne by the person under whose direction the modified milk formulas are prepared. Brenemann has clearly demonstrated this in four cases in which he was able to produce curds in infants' stools and make them disappear at will by manipulation of the food. The chemical composition of these hard curds leads the author to believe that they are not produced as the result of any fault in the digestive functioning of the infant but that they are produced by a normal digestion, functioning on an unnatural food which is only partly modified to a condition adaptable to the requirements of the infant. Cow's milk contains inorganic constituents in sufficient amounts to supply the demands of the rapid growth of the calf and is especially rich in calcium and phosphoric acid, which the calf needs in considerable quantity, but the infant uses very sparingly. When fed to infants in the proportions found in cow's milk, these substances are greatly in excess of the amounts required to supply the demands of the infant, and hence are eliminated either in the urine or the feces.

The insoluble calcium phosphate is inert in so far as its food value to the infant is concerned for it passes through the alimentary canal undigested and unabsorbed and appears in the feces. Its presence in milk, however, is a dangerous factor which must receive proper consideration, for, by the development of acidity within the milk, the calcium combined within the phosphate in an insoluble form is converted into soluble calcium. This soluble calcium, in addition to that naturally present in the milk, together with the developed acidity, have marked influence on the nature of the casein or paracasein curds formed by the action of the gastric juices.

The other two forms of calcium, that combined with the casein and that present as soluble salts in the whey, are responsible for the loss of fat in the form of calcium soaps in the stools, and the author states that they play an important part in causing the protein curds which are found in the stools from some bottle fed infants.

The calcium and casein in cow's milk are the factors involved in the curdling of this milk by the action of rennin. An increase in either the calcium content or the acidity of milk tends to toughen the curds produced by the action of rennin. The calf can digest these curds but the infant fails to completely digest it. The inability of the infant to digest these curds does not indicate an impaired digestive functioning but does indicate a faulty supervision in the feeding of the infant. A control of the curdling milk may be obtained by the addition of lime water. The addition of lime water to milk makes it less acid and results in a decrease in the amount of soluble calcium due to the precipitation of insoluble calcium phosphate. If sufficient lime water is added the soluble calcium can be reduced to such a small amount that the milk will not curdle upon the addition of rennin. The nature of the curd formed by the action of rennin on milk may also be influenced by boiling the milk and by the action produced by the addition of such substances as malt soup,

dextrimaltose No. 3, barley gruel, and Mellen's Food because they contain potassium salts, and also have a certain physical action. The rate of digestion of the curds formed from milk depends upon the surface exposed. The large tough curds produced from cow's milk, will be slowly and incompletely digested in the intestines leaving a residue to be excreted in the feces while the fine soft curds produced from breast milk will be rapidly and completely digested. We know that the removal of the soluble calcium from cow's milk prevents its curdling by the addition of rennin. If calcium is responsible for the curds formed from cow's milk and if the protein curds which appear in the stool are the same curds, undigested, we should expect to find some relation between the calcium and casein intake and the nitrogen eliminated in the stools. Such a relation has been found to exist. These protein curds are composed of protein, fat and dicalcium phosphate, while the protein in the curds is calcium paracasein.

R. N. ANDREWS.

TREATMENT OF PYLORIC STENOSIS: H. Erberg, and B. Hamilton, Stockholm, Sweden. (*Arch. of Ped.*, Dec. 1921.) The author reviews fifty-seven cases and lays down the following principles of treatment:

1. The organism must be supplied with water in sufficient amount.
2. The infants must be nourished with breast milk and
3. Isolated.

The water must be supplied to prevent too high a degree of desiccation. This is a very important part of the treatment. The best way is subcutaneously, and from 100-150 c.c. sometimes twice daily. This may be kept up for several weeks. It is recognized that in any pyloric stenosis there is a tendency to spontaneous recovery. The most dangerous result of the stenosis is probably the desiccation of the organism. Consequently this effect of the stenosis must be counteracted as far as possible in order to save the life of the infant until spontaneous recovery begins. The records show that in those cases which received treatment early the recovery was one or two weeks shorter.

A factor of the greatest importance is the food. The infants are mainly nourished with breast milk, often however one or two meals of buttermilk are given in addition. It has been found that the combination makes the gain in weight more rapid. Usually six meals are given daily and in some instances smaller and more numerous meals are preferable. These babies are best isolated so as to protect them from external infection of any sort.

In a few cases stomach washings seem to have had some effect, but in the majority, where they have been tried, they have not at all influenced the course of the disease. The same may be said of drugs; atropine, cocain and others. The mortality in pyloric stenosis at this hospital is over 3 per cent lower than in previous reports of non-operative cases. The surgical treatment may shorten the duration of the disease but it has the disadvantage that good results seem to be obtained only by specially trained operators. In localities, where the necessary skill is impossible to acquire, because of the scarceness of cases, medical therapy must be employed and may, as seen, in

respect to the prognosis of the disease, be equal to surgical treatment.

R. N. ANDREWS.

THE IMMUNIZING VALUE OF TOXIN-ANTITOXIN

D. J. PARADINE, M. D.

Duluth, Minn.

Some Observations on the Schick Test:

This study was begun fifteen months ago at St. James' Orphanage, Duluth, Minn. Every child in the institution (one hundred and sixty-six) was given the Schick test.

These children ranged in age from two to sixteen years. A large majority of them were under twelve. We found that forty per cent of those under ten years reacted positively; sixty per cent of the children under the age of five reacted positively. In the whole institution, we found that out of the hundred and sixty-six so tested one hundred and four gave a positive reaction. To those who reacted positively we gave the usual course of three injections of toxin-antitoxin, injecting 1 c.c., and repeating this dose every sixth day until we had given three successive injections.

The children were first tested in September, 1920. In the month of January of the following year, we had an outbreak of diphtheria at the institution. No child who had received toxin-antitoxin injections contracted diphtheria. Of the sixty-two who reacted negatively to the Schick test, three contracted diphtheria, while in ten others the presence of the disease was probable, although the bacteriological diagnosis was doubtful.

After the quarantine had been lifted we again tested the children. Those who had reacted positively to the original test and had received the three injections of toxin-antitoxin were found to react negatively. As a further precaution we administered toxin-antitoxin to every child in the institution.

During July, 1921, we again applied the Schick test to all the children. We found that those who reacted positively to the first test given in September, 1920, and whose reaction became negative after the administration of toxin-antitoxin, continued to react negatively at this time, nine months later.

We have had no diphtheria since the outbreak in January, 1921.

Because of these findings we have decided to administer toxin-antitoxin, as a routine procedure, to all children entering the institution, regardless of their reaction to the Schick test, for we believe this test to be no criterion of susceptibility or non-susceptibility to diphtheria in institutional work.

Numerous inquiries have reached us regarding the after-effects of the injection of toxin-antitoxin. Aside from a slight soreness and swelling at the site of injection, no ill effects were noted. From our experience it would seem that the younger the recipient the less the subsequent inconveniences.

It is our intention to record further observations on the effects of toxin-antitoxin in a later report during the current year.

In this work I have been ably assisted by the interns of St. Mary's Hospital, to whom I wish to express my thanks.

D. J. PARADINE, M. D.

MINNESOTA STATE BOARD OF MEDICAL EXAMINERS

PHYSICIANS LICENSED AT THE JANUARY, 1922, EXAMINATION TO PRACTICE IN THE STATE OF MINNESOTA

BY EXAMINATION

NAME	SCHOOL OF GRADUATION	RESIDENCE
Adams, Robert Warren.....	U. of Minn., M. B., 1921.....	General Hospital, Minneapolis
Bregel, Fred L.....	U. of Minn., M. D., 1918.....	629 Washington Ave. S. E., Minneapolis
Chang, Pu Yung.....	Harvard, China, M. D., 1917.....	Hopewell Hospital, Minneapolis, Minn.
Christie, Robert L.....	U. of Minn., M. D., 1917.....	Long Prairie, Minn.
Crompton, Chas. R. B.....	U. of Toronto, M. B., 1915.....	Mayo Clinic, Rochester, Minn.
Daniel, Lewis M.....	U. of Minn., M. B., 1921.....	914 Lowry Bldg., St. Paul, Minn.
Dvorak, Benj. A.....	U. of Minn., M. B., 1921.....	University Hospital, Minneapolis
Dahlin, Ivor Theo.....	U. of Minn., M. B., 1921.....	4032 Park Ave. S., Minneapolis, Minn.
Farnham, Russell Milton.....	U. of Minn., M. B., 1921.....	2416 Fremont Ave. S., Minneapolis, Minn.
Ford, Burton Calvin.....	U. of Minn., M. B., 1921.....	St. Mary's Hospital, Minneapolis, Minn.
Green, Robert Gladding.....	U. of Minn., M. B., 1921.....	University of Minnesota, Minneapolis, Minn.
Hastings, DeForest R.....	U. of Minn., M. B., 1921.....	421 Walnut St. S. E., Minneapolis, Minn.
Jernstrom, Roy E.....	U. of Minn., M. B., 1921.....	1800 3rd Ave. S., Minneapolis, Minn.
Kucera, Frank Jos.....	U. of Minn., M. B., 1921.....	Hopkins, Minn.
Larson, Leonard Winfield.....	U. of Minn., M. B., 1921.....	329 Union St., Minneapolis, Minn.
Leopard, Brand A.....	U. of Minn., M. B., 1921.....	Melrose, Minn.
Lowe, Earl Raymond.....	U. of Minn., M. B., 1921.....	Northern Pacific Hospital, St. Paul, Minn.
Lund, Harold O.....	U. of Minn., M. B., 1921.....	St. Mary's Hospital, Minneapolis, Minn.
Maeder, LeRoy M. A.....	U. of Minn., M. B., 1921.....	512 S. E. Delaware St., Minneapolis, Minn.
Morris, Ralph Edwin.....	U. of Colorado, M. D., 1902.....	244 Nelson Ave., St. Paul, Minn.
Meyer, Paul F.....	U. of Minn., M. B., 1921.....	Belle Plaine, Minn.
Murdy, Robert Colliver.....	U. of Minn., M. B., 1921.....	1021 S. Washington St., Aberdeen, S. D.
McMurtrie, Wm. Burns.....	U. of Minn., M. B., 1921.....	Proctor, Minn.
McInerny, Maurice W.....	U. of Minn., M. B., 1921.....	St. Mary's Hospital, Minneapolis, Minn.
Owens, Percy Laing.....	U. of Minn., M. B., 1921.....	General Hospital, Minneapolis, Minn.
Oppegaard, Chester L.....	U. of Minn., M. B., 1921.....	University Hospital, Minneapolis, Minn.
Plankers, Arthur G.....	U. of Minn., M. D., 1918.....	858 Cherokee Ave., St. Paul, Minn.
Richardson, Geo. Edward.....	U. of Minn., M. B., 1921.....	510 Essex St. S. E., Minneapolis
Radtke, Herman P.....	U. of Minn., M. B., 1921.....	429 Union St. S. E., Minneapolis, Minn.
Spurzem, Raymond Jacob.....	U. of Minn., M. B., 1921.....	University Hospital, Minneapolis, Minn.
Shepard, Wm. P.....	U. of Minn., M. B., 1921.....	512 Delaware St. S. E., Minneapolis, Minn.
Stewart, Louis Arthur S.....	McGill, M. D., 1916.....	Rochester, Minn.
Spain, Roderick Jos.....	National U., Dublin, Ireland, M. D., 1918	Duluth, Minn.
Thordardson, Solveig S.....	U. of Minn., M. B., 1921.....	2202 Blake St., St. Paul, Minn.
Tanquist, Edwin John.....	U. of Minn., M. B., 1921.....	Swedish Hospital, Minneapolis, Minn.
Urberg, Sofus E.....	U. of Minn., M. B., 1921.....	329 Union St. S. E., Minneapolis, Minn.
Wangensteen, Owen H.....	U. of Minn., M. B., 1921.....	429 Union St. S. E., Minneapolis, Minn.
Wolfe, Howard H.....	U. of Minn., M. B., 1921.....	1799 Lincoln Ave., St. Paul, Minn.
Waldschmidt, Reuben H.....	U. of Minn., M. B., 1921.....	509 E. River Road, Minneapolis, Minn.
Zeckwer, Isolde Therese.....	Woman's Med. Col. Pa., 1919, M. D.....	Rochester, Minn.

THROUGH RECIPROCITY

Ahrens, Edward G.....	Bennett, 1911, M. D.....	Bellingham, Minn.
Anderson, Walter Thos.....	Johns Hopkins, M. D., 1917.....	1038 Lowry Bldg., St. Paul, Minn.
Asbury, Eslie	U. of Cincinnati, M. D., 1920.....	Rochester, Minn.
Bowing, Irwin Ellis.....	Rush, M. D., 1921.....	1138 N. Leavitt St., Chicago, Ill.
Burns, John Gillett.....	Johns Hopkins, M. D., 1920.....	Rochester, Minn.
Carman, Russell Daniel.....	Marion Sims, M. D., 1901.....	Rochester, Minn.
Crawford, Albert S.....	Cornell, M. D., 1915.....	Rochester, Minn.
Davis, Kenneth S.....	U. of Nebraska, M. D., 1918.....	Rochester, Minn.
Freed, Cecil Forest.....	U. of Pa., M. D., 1920.....	Parkersburg, West Virginia
Goehring, Carl	U. of Mich., M. D., 1915.....	Rochester, Minn.

Herbst, Wm. Parker, Jr.....	Georgetown, M. D., 1915.....	Rochester, Minn.
Jameson, Carol E.....	Stanford U., M. D., 1921.....	Rochester, Minn.
Kent, Geo. Benjamin.....	Indiana Univ., M. D., 1916.....	Rochester, Minn.
Klaveness, Eivind.....	U. of Christiania, M. D., 1897.....	625 Palace Building, Minneapolis, Minn.
Larson, Ernest Eric.....	Rush, M. D., 1920.....	Rochester, Minn.
Lyons, John Hugh.....	Geo. Wash. Univ., M. D., 1918.....	Rochester, Minn.
Lyons, Shirley C.....	Tulane, M. D., 1919.....	Rochester, Minn.
Mahle, Arthur E.....	Wash. U., M. D., 1918.....	Rochester, Minn.
Moran, Robert Emmet.....	Georgetown Univ., M. D., 1920.....	Rochester, Minn.
Seed, Lindon.....	Rush, M. D., 1921.....	Rochester, Minn.
Willy, Ralph G.....	Rush, M. D., 1916.....	Kimball, S. D.

NATIONAL BOARD CREDENTIALS

Barrier, Chas W., Jr.....	Tulane, M. D., 1917.....	Rochester, Minn.
Finney, Wm. Parker, Jr.....	Johns Hopkins, M. D., 1916.....	Rochester, Minn.
Heacock, Chas. Hunter.....	U. of Pa., M. D., 1917.....	Rochester, Minn.

BOOK REVIEWS

BOOKS RECEIVED FOR REVIEW

GLANDS REGULATING PERSONALITY. Berman, Macmillan Co.	RADIANT ENERGY AND OPHTHALMIC LENS. Booth, P. Blakiston's Son & Co. \$2.25.
COMPEND OF PHYSIOLOGY. Brubaker, P. Blakiston's Son & Co. \$2.00.	FOOD PRODUCTS, THEIR SOURCE, CHEMISTRY AND USE. 2nd Edition. Bailey, P. Blakiston's Son & Co. \$2.50.
OPERATIVE SURGERY. Horsley, C. V. Mosby Co. \$10.00.	SCIENCE OF OURSELVES. Fuller, Oxford University Press.
PROSTHETIC DENTISTRY. Gabell, Oxford University Press, \$4.25.	FUNDAMENTALS OF BACTERIOLOGY. Morrey, Lea & Febiger. \$3.25.
MENTAL HOSPITAL MANUAL. MacArthur, Oxford University Press. \$5.25.	NUTRITION AND CLINICAL DIETETICS. Carter. \$7.50.
STUDIES IN DEFICIENCY DISEASE. McCarrison, Oxford University Press. \$10.00.	EVOLUTION OF DISEASE. Danysz, Lea & Febiger. \$2.50.
EPISCOPAL HOSPITAL REPORTS. Vol. V. 1917-1920.	ASSESSMENT OF PHYSICAL FITNESS. Dreyer, Paul B. Hoeber. \$3.50.
HUMAN ANATOMY. 6th Edition. Jackson, P. Blakiston's Son & Co. \$10.00.	DISEASES OF THE SKIN. Ormsby, Lea & Febiger. \$10.00.
DISEASES OF THE SKIN. 4th Edition. Sutton, C. V. Mosby & Co. \$9.50.	CREATIVE CHEMISTRY. Slosson, The Century Co. \$3.00.
GENERAL PATHOLOGY. Oertel, Paul B. Hoeber. \$5.00.	LIFE OF JACOB HENLE. Robinson.
	EPIDEMIOLOGY AND PUBLIC HEALTH. Vaughn, C. V. Mosby Co. \$9.00.
	OPERATIVE SURGERY, 6th Edition. McGrath, F. A. Davis Co. \$8.00.

TUBERCULOSIS AND HOW TO COMBAT IT. F. M. Pottenger, C. V. Mosby Co. \$2.00.

This is a book for tuberculous patients and aims at educating them not only as to their own particular ailment and its treatment but also in regard to prevention.

As the author explains, it is a compilation of talks given to his patients and is not intended to take the place of a physician.

There is a minimum of things technical in the book which makes it easily read and understandable by the laity.

EVERETT K. GEER, M. D.

STARVATION (ALLEN) TREATMENT OF DIABETES.

L. W. Hill & R. S. Eckman, W. M. Leonard, Publisher.

This is the fourth edition of a small but important book. Its purpose is not so much to instruct the patient regarding the theory of the disease as it is to keep him in the straight path of suitable diet.

There are numerous diets given preceded by a short explanation of the details of treatment.

EVERETT K. GEER, M. D.

REFRACTION AND MOTILITY OF THE EYE. Alger. Second revised edition. F. A. Davis Company, Philadelphia. 1920.

The first edition of this work was published in 1910. The new edition, following much the plan of the first, appears in eighteen chapters, contains 367 pages, and is accompanied by 125 illustrations. The author follows the usual plan adopted for works of this scope, taking up in order, and very briefly, physiological optics, anatomy, methods of examination, errors of refraction, and those of motility. There are included, also, chapters on color blindness, fields of vision, relation of functional eye disease to general medicine and ocular malingering. Treatment of these subjects is necessarily elementary and the work is, therefore, best adapted to the needs of medical

students and those beginning the study of the specialty.

CHARLES E. CONNOR.

GRAPHIC METHODS IN HEART DISEASE. By John Hay, M. D., F. R. C. P. With an Introduction by Sir James Mackenzie, M. D., F. R. C. P.

This book is an Oxford Medical Publication, second edition, 1921. It consists of 178 pages of really worthwhile reading. Its 176 illustrations, which for the most part are those of typical polygraphic and electrocardiographic records, are very well chosen and, indeed, clinch the important facts brought out in the text.

The introduction by Sir James Mackenzie is a timely plea for the more widespread use of instrumental methods in cardiovascular disease in clinical medicine. As he says,—"In clinical medicine, the recognition of symptoms depends to a very great extent upon the senses of the observer. * * * To supplement the inadequate power of perception, the imagination is often called upon, with the result that statements are made which are supposed to be a true description of facts, but which are in reality a combination of imperfect observation and possible erroneous deduction. * * * The result is that many features of the circulation are misunderstood, while many others have not been recognized. * * * When care is taken to avoid errors due to defective apparatus, the tracing of any movement of the circulation obtained by instrumental means remains as a true and permanent record of an actual event. The interpretation of tracings should be kept distinct in our minds from the actual record itself. The latter is a true representation; the former represents the present phase of our knowledge, which may or may not be correct. * * * The employment of these methods of investigation is giving not only a stimulus to further inquiry, but is acting as a guide in directing the inquiry towards a definite aim in the fields of physiology, pathology and pharmacology, as well as in clinical medicine. * * * A further benefit is derived from the employment of graphic methods in that it compels the clinician to think clearly, to reason with precision, and to observe with accuracy."

The book was so absorbing, contained so many interesting facts and explanations and was all-in-all so worth while, that the reviewer read it with increasing enjoyment four times. He still feels that he could read it again with profit.

The author, in his introduction, calls attention to the chief points of advance in graphic methods, and the rela-

tion of these methods to the advance in our clinical knowledge of cardiovascular diseases in the eleven years since the publication of his first book. The aim of the author is to make intelligible the graphic records so widespread in the literature today. In this purpose he has certainly succeeded, especially as far as the polygraphic section is concerned, which is unusually complete. The electrocardiographic section, which was purposely brief, is too much so to be of any great value. The illustrations in this section are very good as far as they go.

The polygraphic section opens with a definition of the common terms; this is followed by a presentation of the myogenic theory and some necessary anatomical considerations. The author then describes the various types of instruments available and the relative merits and disadvantages of each. There is a little too much time spent here in the description of the older and less used types of instruments. In the twenty-five pages that follow there is a careful and timely consideration of normal records, generously illustrated. Then in the following order he takes up in detail the auricular type of venous pulse; extrasystoles, with a careful description of each type; the ventricular type of venous pulse, its diagnosis, treatment and prognosis; and disturbances of function (conductivity, excitability, contractility, sinus production, sinus arrhythmia, paroxysmal tachycardia, auricular flutter, and tonic-ity). He then inserts a short chapter on difficulties in interpretation of sphygmograms, and also a short one on an illustrative case of mitral stenosis.

Throughout the polygraphic section the definitions and interpretations are very good, and the accompanying illustrations nicely show the important points. The author has failed in one important detail, however, and that is he has neglected to present a system for the examination of the records, which, to the beginner at least, is vital.

In the electrocardiographic section, as has been stated previously, the author presents a number of good illustrative records but the accompanying text is little more than a statement of the various conditions indicated in this type of record. Here too the author has omitted to outline a systematic procedure.

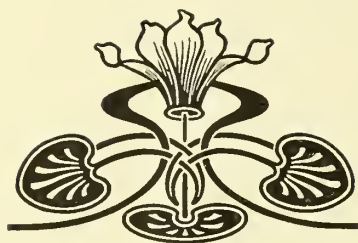
This book can well be recommended not only to those wishing a sufficient knowledge on this subject to explain to them the graphic records so frequently included in the literature, but also to those more acutely interested in polygraphic and electrocardiographic work.

HAROLD E. RICHARDSON, M. D.

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HERPES CORNEA

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The father of Ophthalmology, Albrecht von Graefe, who died in 1870, 42 years old, knew herpes corneæ, which he treated with calomel for the purpose of mechanically destroying the vesicles. The treatment would be more rational today, as we look upon herpes corneæ being an infectious disease and as we know that calomel has a chemical as well as mechanical action, liberating corrosive sublimate with the tears. About this treatment Saemisch (Bonn) writes in 1876, that it does not prevent new eruptions of herpes, and does not seem to shorten the process, and that atropin, which always is indicated, and compression, which is not always tolerated, has not the desired influence upon the run of the disease. He further mentions that iritis is a rare complication, that the tension is sometimes reduced, that the sensibility of the cornea is lowered, that the epithelization, the process of repair, is slow, and that we have no reliable treatment for the protracted painfulness of the disease.

The literature on herpes corneæ dates back to Horner (Zürich), who presented a paper on the subject at the ophthalmological meeting in Heidelberg in 1871. He reported 31 cases of genuine herpes corneæ after catarrhal affections of the respiratory tracts. In 28 of the cases herpes on lips and nostrils was also present. He also found reduced sensibility of the cornea and lowered intraocular tension. This particular form of herpes bears also his name: Herpes Corneæ catarrhalis sive febrilis Horneri.

From then on, the text books begin to recognize herpes corneæ as a clinical entity. About 50 textbooks have been published since, and herpes corneæ figures today as corneal manifestation of neuritic disease of endogenous infectious origin. On one side we have the clinical picture of a corneal lesion, that everybody can see. On the other side we have a neuritis of the corneal nerves somewhere

in their course from Gasser's ganglion to the corneal epithelium, that nobody can see, but that the patient will feel, the doctor can demonstrate by examination of the corneal sensibility and which the pathologists have proven in post-mortem specimens.

This article is not written for a trivial presentation of a limited number of cases; it is written for the purpose of guiding the practitioner, who so often is the first man in the case; it is an unpretentious paper for the medical public at large. The experienced, up-to-date oculist has no need of this communication, while some of the men, who confine their practice to the diseases of the eye, ear, nose and throat, may welcome it, and this I have some reason to believe.

There are two principal forms of herpes corneæ: herpes febrilis and herpes zoster. These are apparently two different varieties. Herpes febrilis corneæ appears after febrile diseases with or without simultaneous eruption of herpes on the lips. Herpes zoster corneæ can not be traced back to a "cold" and is claimed by Hutchinson to be a part of herpes zoster ophthalmicus and should not occur on the cornea unless there are eruptions on the forehead and particularly on the nose along the naso-ciliary nerve. This theory has, however, not been generally accepted.

If we cannot trace herpetic eruption on the cornea back to a "cold" and do not see herpes zoster frontalis and nasalis, we accept a herpes simplex from unknown causes. In these "focal" times, bloodthirsty eyes look upon the teeth, tonsils and sinuses with intentional suspicion.

Finally, the various authors speak of keratitis dendritica as a disease identical with, or near related to, herpes febrilis, where the clinical picture in the cornea assumes a superficial ramifying appearance and runs a very chronic course over weeks and months,—in my opinion, ramification of an original herpes corneæ. This form of keratitis is of a later date than herpes febrilis and zoster. Hansen-Grut described it as dendriform (mycotic) keratitis.

Herpetiform affections of the cornea are sometimes observed after scratchings with finger-nails. I have just discharged such a boy, who had been tortured for three months and where I could demonstrate reduced sensibility. It happens that babies scratch their mother's eye, producing a painful keratitis. (Hansen-Grut, Copenhagen.)

With the visitation of influenza, herpes corneae febrilis and dendritic keratitis became of so frequent occurrence that I, for my part, had almost daily experience with one or another. This does not mean that I saw fresh or relapsing cases every day; neither does it mean that I only saw the febrile forms, nor the simple. It rather means that the herpes, in one form or another, usually covers a long course and that the next case reports while the preceding one is still under treatment and that they otherwise may come any part of the year—colds or no colds. The great rule was a preceding influenza.

As my material—most of it being, like myself, of Norwegian blood—comes from a distance, these patients have naturally and, as a matter of course, first consulted their home physicians; and every one came with a diagnosis of "ulcer,"—bandaged, covered up or with dark glasses, and all of them had uniformly been treated with argyrol, boracic acid, and atropin. The neuritic nature of the ulcer had not been diagnosticated.

Argyrol—and I speak from experience—has become obsolete in my practice and is in my humble opinion worse than useless as an ocular therapeutic agent, being a dirty paint and little else. Its name is not even mentioned in the recent European textbooks (Rómer, Axenfeld, Schiek, Mayou, Fuchs). In Duane's American translation of Fuchs' Ophthalmology, argyrol is advertised in eight different places as a remedy in diseases of the conjunctiva, the lachrymal apparatus and after operations for cataract, but not in corneal diseases.

Boracic acid—the time-honored, venerable placebo, that never harmed any eye—may be useful for the removal of conjunctival secretions by flushing or bath, but, in itself, it is a remedy for nothing in the eye.

Atropin—the remedy much abused by the oculists and general practitioners alike—is our principal local remedy in diseases of the iris, but has no place in treatment of corneal troubles except under special conditions, which will be touched upon under the treatment of herpes.

Besides this local treatment with argyrol, boracic acid and atropin the patients in mention might have been properly relieved in their pains by appropriate medication (phenacetine, aspirin, quinine, narcotics). The bowels might have been freely opened to let out the enemy—an always appreciated operation to the patient. Perhaps, our patient has been advised to have his tonsils removed and his teeth extracted; but, this would be post festum. The damage was already done and the prevention of future relapses would only be a *pium desideratum*.

It is far from my intention to reflect upon the home doctor's diagnosis and treatment. Neither did I ever allow the patient to abuse him as an excuse for leaving him, nor was it necessary. It always pays to be charitable to one another and always remember that there will come another doctor after us and that there may be a day of reckoning. I would not say that the doctor's treatment was wrong, since he used non-irritating remedies; but it was mistaken treatment and did not hit the mark. And how can you expect any good from the treatment of corneal diseases with remedies for conjunctivitis and iritis? The wrong was that the treatment did not give the desired relief; so the patients came my way.

In his recent master-work, Heine* writes that the cornea, which possibly is the most sensitive organ in the whole body, can, for the same reason, sometimes be the very first organ to react upon noxæ which affect the entire body and that particularly cerebral and meningeal irritations sometimes are solely disclosed in a corneal affection,—neuritic corneal diseases. To this group belong herpes corneae, keratitis dendritica, keratitis bullosa, herpes zoster ophthalmicus, keratitis neuroparalytica and, perhaps, dystrophia epithelialis (Fuchs).

In 25 carefully examined cases of such neuritic corneal diseases the lumbar pressure was normal only in 3 cases; in the other 22 the cerebral pressure was more or less increased. In 15 of the 25 cases the iris was involved. In 14 cases the intraocular tension was normal 6 times, increased 5 times and decreased 3 times. A careful test for corneal sensibility was made in 21 cases; in 7 cases it was intact outside the affected parts; 14 times it was reduced or extinct. In 11 cases the blood-pressure was increased 6 times, normal 5.

*Die Krankheiten des Auges in Zusammenhang mit der inneren Medizin und Kinderheilkunde, Von Professor Dr. L. Heine, Geheimer Medicinalrat, Director der Universitäts-Augenklinik, Kiel, Berlin, 1921.

Thus it seems to Heine that the neuritic diseases of the cornea frequently are symptoms of increased cerebral pressure. Because of the frequent iritic complications it is near at hand to think of a toxic or infectious noxa as the cause of the irritation in the meninges and the uvea, both of which present so many parallels. The question arises, he continues, whether the herpes and similar affections are dependent upon the increased cerebral pressure—what he is inclined to believe—or whether they possibly result from the noxa itself; whether they consequently present a parallel symptom to the increased cerebral pressure, as he might consider meningitis and uveitis as parallel symptoms. A certain decision in this question he seems to see in the effects of artificial reduction of the cerebral pressure. In fact, Heine believes he has seen sometimes quite evident favorable effects of lumbar puncture with shortening of the duration of the disease.

In other cases of non-neuritic corneal diseases, Heine could seldom and only to a small degree demonstrate increased intracranial pressure. This is very interesting and valuable information and is only one instance of the numerous individual teachings with which Heine's book is saturated and which, together with the generous illustrations, make an early translation into the English language timely and desirable.

Sattler (Leipzig) described, in the late seventies, pathological changes in a case of herpes zoster ophthalmicus. The root in the ganglion Gasseri for the first branch of the trigeminus, a ciliary nerve in the suprachoroidea and a place in orbiculus ciliaris showed inflammatory changes, while the second and third roots were normal. Gilbert (Munich) describes, in 1921, perineuritis and endoneuritis of the ciliary nerves on both sides of and in the ciliary ganglion, and chorioiditis next to a neuritic ciliary nerve in a case of herpes zoster. This observation explains to him the genesis of the herpetic uveitis, resulting from neuritis of the ciliary nerves and ganglion.

During the last two years the German ophthalmological literature is teeming with publications of researches made to demonstrate presence of herpes corneæ virus and its nature.

Grüter (Marburg) rightly claims the priority of proving the infectious nature of the herpes febrilis vesicles. He succeeded numerous times in producing a corneal picture strikingly like dendritic kera-

titis by inoculation from herpes febrilis in men to the cornea in rabbits. He could inoculate back from the rabbits to blind human eyes with the same result. He never observed vesicles, but always changes in the sensibility. Bacteriological and cell studies gave negative results. Grüter believes the virus is specific, producing a necrosis of the epithelium and after a while also of the adjoining parenchyma. The vitality of the virus is low; it does not live long outside the organism and is very sensitive to changes in temperature. Experimental dendritic keratitis in rabbits healed much quicker than dendritic keratitis in men. His experiments date back to 1912.

Löwenstein (Prag) worked on the same subject about the same time. He inoculated the contents of herpes febrilis on the skin to the cornea in rabbits with positive results. Inoculation with herpes zoster vesicles on the skin was negative,—the same had been verified by others. By introduction of the herpetic virus in the anterior chamber of rabbits, he could produce severe iritis. He considers it probable, that many a case of obscure iritis might be of herpetic origin, the virus circulating in the blood. Immunity for months results from the inoculation. The virus is exceedingly active even in dilutions, but is very transient and could not be cultivated. The epithelial cells showed products of reaction to the penetrating virus.

Stocker (Bern) repeated Grüter's inoculations on the cornea in rabbits with material from herpes "febrilis" corneæ in men. In all cases he obtained a typical dendritic keratitis with decreased sensibility of the cornea, but he never observed vesiculæ. Two of his animals died. Specificity of the virus he proved by negative control experiments and by positive inoculations from rabbit. He succeeded also in creating dendritic keratitis without inoculation of the cornea by only transferring the material to the conjunctival sac. The period of incubation was extended in these cases several days. What the specific virus really is—if it is a toxic product or a formed virus—could not be decided positively. The inoculability from animal to animal makes a formed virus more probable, but we are far from knowing the real offender. He recommends treatment with tincture of iodine (Friedenwald, Sidler-Huguenin) and zinc-iontophoresis (Wirtz, Stocker, Schnyder).

Kooy (Utrecht) repeated Löwenstein's experiments in the university eye-clinic, Amsterdam, and could verify them. She succeeded in obtaining cul-

tures, with which she could produce at will the typical dendritic keratitis. According to Miss Kooy, the smear showed a polymorph picture with variations of bacteria and fungi (mycobacteriaceæ).

Doerr and Vöchting (Basel) noticed that rabbits whose cornea had been inoculated with herpes virus sometimes developed constitutional symptoms from which they as a rule died and which had a striking likeness with the symptoms in rabbits inoculated with the virus of encephalitis epidemica.

Doerr and Schnabel (Basel) found, further, that the herpes virus not only produces local processes in rabbits but also a general infection, which localizes particularly in the central nervous system, and that pulp from such an infected brain can be transferred directly to the central nervous system or to the cornea of normal rabbits. They could further state that the virus circulates in the blood of the infected rabbits and that intravenously infected animals could suffer local processes in the cornea without inoculation. Consequently, the virus can not only generalize itself from the cornea but also metastasize in the cornea from the blood or lymph. They point to the apparent similarity between the herpetic constitutional infection in rabbits and the experimental encephalitis epidemica, which makes a near relationship, if not identity, between the two probable.

In a second article, Doerr and Schnabel call attention to the different virulence in the same herpes eruption according to the stage of the infection (first or fourth day). Most striking is the variation in virulency in the different strains. A valid variation between virulency and locality of the material could not be discovered. After recovery from herpes corneæ in rabbits, the animal remains immune for a long time; in men, relapses and new infections are not rare. This can not be explained any other way than that the virus is always present in such persons. They tried to demonstrate the presence of the virus on the lips, nostrils and in saliva and nasal secretions. The nasal secretion in rabbits on the corresponding side proved also to be virulent. In healthy individual the virus could not be detected in nasal secretions or in saliva. Saliva in an individual with fresh herpes labialis was found virulent. In dried-up herpes, the saliva was sometimes virulent, sometimes not. Only a certain percentage of herpetics are consequently herpes carriers. After herpes corneæ was healed, the virus remained in the saliva

—respectively, through five and one-half to seven and one-half weeks. In two cases of relapsing herpes corneæ, the saliva was not infected after recovery from the relapse; the nasal secretions also being negative. These results demonstrate that the infection of the skin, and probably of the cornea, can be contracted by the saliva; that the infectiousness of the saliva precedes the skin eruption and does not cease with the cure of the cutaneous and corneal infection; finally, that by habitual herpes the virus can remain in the saliva between the eruptions, making many a "herpetic" man a herpes-virus carrier with periodical autoinfection. The virus for epidemic encephalitis is also found in the saliva, nasal secretion and particularly in the salivary glands—a new proof of the hypothetic identity of herpes and encephalitis virus.

The herpes question is intense today. I could have quoted several other names, also, from this country. Almost every periodical brings contributions. What I have extracted from the literature is enough for my purpose and contains the essentials. I trust the future will disclose the real "rebel"; so far he keeps hidden and is undiscovered.

Thus the practitioner can save himself the trouble of making smears from the secretions or scrapings for microscopical examinations. Fortunately, bacteriological examinations are not needed, as we have unmistakable clinical evidences and data at our disposal for the diagnosis of herpes in its different stages and forms.

The blistering of the cornea—the vesicular keratitis—is in itself characteristic; and if the eruption, in groups or rows, was preceded by some kind of a "cold" (pneumonia, bronchitis, influenza, grippe, intermittens), and if "cold sores" on the lips or ala nasi were present, we have all reason to suspect herpes febrilis. As the vesicles rupture after a few hours, the disease is rarely seen in this stage and the picture is now that of an epithelial defect with shreds of necrotic epithelium adherent to the margin of the superficial ulcer, the bottom of which presents the Bowman membrane on a slightly opaque base. The epithelial defects are readily colored with fluorescein or, still better, with mercurochrome (fluorescein-mercury), either in a 2 per cent solution, and is usually of irregular shape. They could only be confounded with traumatic erosions, whose bases, however, are not opaque, and with eczematous keratitis, which is a children's dis-

ease and usually multiple. In herpetic erosions there is always hypesthesia or anesthesia of the cornea; in the others not.

Eruption of herpes corneæ takes place under marked irritative symptoms, ciliary injection, laceration, photophobia and ciliary pains. While the first three are more or less present in all forms of keratitis, the ciliary pain in herpes is characteristic because of its neuralgic character. While the pains of ordinary keratitis are localized to the cornea itself, the pains in herpes are irradiating along the inflamed ciliary nerves to the ganglion Gasseri (ciliary pains), so the patients suffer at the same time from eyeaches as well as frontal, meningeal headaches and need more than local applications for their relief; the pains may be very severe at different times of the day. This is extremely important to know, as headaches only occur in other corneal diseases, when the inflamed cornea is put under pressure, either extrabulbar (blepharospasm) or intrabulbar (increased intraocular tension), as may be the case in scrofular keratitis and serpentic ulcers.

Characteristic for herpes is also its torpidity and avascularity. As long as the disease is confined to the epithelium, no blood-vessels are either needed or desirable, as epithelization has nothing to do with corneal blood vessels. Ciliary injection is enough. But, if the disease extends into the substance of the cornea, vascularization is needed for fight, victory and repair—and will come. In these cases, permanent opacities will be the final result. If we can keep the cornea free from secondary infection or deeper invasion, good eyesight is assured.

The torpidity of herpes corneæ and the delayed epithelization has been laid to trophic influences and lack of vascularization. I do not see any necessity of catering to the hypothetical trophic nerves in this question. As long as the neuritis is active and as long as poisonous material with necrosing effect upon the epithelium filters out on the cornea and in the conjunctival sac, we can not expect epithelization, and as long as the disease is epithelial, vascularization is uncalled for. In this way I explain the torpidity that may extend through weeks and months.

The most characteristic symptom in herpes corneæ—the symptom which really stamped the disease as a neuritic keratitis and which took some time in recognition—is the ever-present anesthesia or hypesthesia of the cornea, confined to the affected areas or to the entire surface. Not enough

stress can be placed on the routine examination of the sensibility of the cornea in ocular diseases. The cornea is the most sensitive organ in the human anatomy to touch. Every cell has its nerve and the slightest touch brings a quick and powerful response from the lids under normal circumstances. Otherwise, the sensitivity of the cornea varies in different individuals and ages—the old cornea being less sensitive than the young. Heine, and also Stocker, recommend a pointed cotton applicator. I have adopted this and find it very convenient and effective. A little absorbent cotton rolled around the end of a match or toothpick and brought to a fine point serves the purpose and is always on hand. It must not touch the lashes. Both eyes should be tested for comparison.

A further characteristic of herpes corneæ is that it, as the great rule, spares children and the aged, and that it is almost without exception unilateral.

The foregoing remarks refer particularly to herpes febrilis; they hold good also for herpes simplex. Herpes zoster corneæ differs in some respects from herpes febrilis and simplex. Its infectiousness has not been proven by inoculations; until that time comes, we have to consider it a toxic affair; it is usually complicated with enormous herpetic eruptions on the forehead and along the nose, is more rare, but also more dangerous to the eye by uveal complications and may even lead to final enucleation. Besides, it does not spare old people. It is from specimens of herpes zoster that the pathologists have been enabled to examine the trigeminal nerve under the microscope.

If the practitioner will bear in mind the above named characteristic of herpes—the superficial affection, the neuralgic pains, the avascularity and particularly the decreased sensibility—he will have no difficulty in recognizing the real nature of the disease before him and he will not use the misleading name ulcer, but call it either a “cold-sore,” if it is herpes, or “shingles,” if it is dendritic keratitis or herpes zoster. He will know that he usually will have a long problem before him, but also that patience, prudence and tact are the first necessities to overcome the difficulties.

Herpetic keratitis (neuritis cornealis, Gilbert) is often complicated with herpetic iritis. This iritis can, like the keratitis, be of lighter or severer type, but it is always chronic. If it always is a descending uveitis or if it may result from invasion from without through the anterior chamber, I must leave to others to decide. The question is up today and

Gilbert (München) has been the first man to describe the typical symptom-complex in a series of 9 cases. Löwenstein has, as mentioned above, called attention to the possible herpetic character of iritis in obscure cases. I myself have under treatment a man who contracted an iritis on the one side 3 months ago, but apparently no keratitis, and who got a relapse the other day with simultaneous herpes eruption of the lip on the same side. He shows marked reduction of the corneal sensibility in the iritic eye. The tension of the eye is minus. I have another old man, who got herpes zoster frontalis and nasalis and iritis, but apparently no keratitis, a few months ago. He came to me with acute glaucoma, and extensive posterior synechia without iris bombé. The tension was + 2. Atropin, massage and repeated paracentesis has reduced the tension. In this case the sensibility of the cornea is also markedly reduced. Therefore, be always on the lookout for herpes eruption anywhere and reduced corneal sensibility in one-sided, chronic iritis and spare the patients tests for syphilis and tuberculosis.

TREATMENT

What we have to deal with in a case of herpes corneæ is a descending neuritis of different extent and intensity somewhere in the course of the first branch of the trigeminal nerve from Gasser's ganglion through the ciliary ganglion to the corneal epithelium,—a painful, infectious neuritis, whose toxine paralyzes more or less the sensibility of the cornea (anesthesia dolorosa), blisters the corneal epithelium in irregular foci, causes necrosis of the vesicles, which soon burst, leaving a superficial epithelial defect through which the poisonous material steadily filters, retarding epithelization, producing further epithelial invasion and destruction (keratitis dendritica) as long as the descending neuritis is active, and inviting invasion of the cornea itself and secondary infection. Besides, we have often complications with herpetic uveitis.

The primary trouble, the neuritis itself, is not accessible to direct treatment. Heine gives us hope of relieving the neuritis and shortening the course of the disease by spinal puncture. Since I read his book I have not had a new case of herpes corneæ to try it on. Thus far I have tried to influence the neuritis with parenteral injections of milk. With 4 to 5 day intervals, I inject into the gluteal muscle successively 5, 7.5 and 10 grams of fresh milk, sterilized by boiling 5 minutes. This foreign

proteid treatment is consequently no cure for neuritis, but I am under the definite impression that it sometimes is helpful. It was rather popular among the patients, who always were anxious to try anything and who never complained of the reaction and temporary discomfort. Internally, I tried to relieve the neuralgic pains with free use of aspirin, phenacetine, quinine, heat and narcotics. For rest and sleep I gave codeine and luminal. I regularly examined the urine for indican (chromaturia) and gave calomel in case the urine was toxic.

Turning to the other end of the question—the corneal manifestations—it seems to me that the safest, quickest and best treatment is curetting of the infectious eruption, followed by thorough disinfection of the entire eye, including the lids, with a reliable, penetrating, non-irritating germicide, as curetting alone is hardly a radical measure. Tincture of iodine, which has gained some ground for the disinfection of blisters, is a powerful germicide, but too irritating to the eye in general. I have chosen for my purpose the new, penetrating, only slightly irritating, powerful American germicide, mercurochrome, in 2 per cent solution. The operation is simple and harmless. The eye is anesthetized with holocain or cocain, whereafter the vesicles and shreds are scraped off with a cataract knife, curette or spud. As the operation is practically painless, speculum and fixation is seldom needed. The cornea and the conjunctiva, which also needs disinfection, is now flooded with mercurochrome, which will stain everything it comes in contact with, beautifully red, particularly the affected parts of the cornea, and deeply at that. The lids are also painted. The eye is covered up for the day with a light gauze-pad, anointed with 10 per cent noviform ointment to facilitate the drainage, and is fastened to the skin with plaster strips. An hour before the operation the patient is given 5 grains of phenacetine, $\frac{1}{4}$ grain codeine and $1\frac{1}{2}$ grains luminal to quiet him before and comfort him after the operation. The same preliminary I use with a great deal of satisfaction in all my operative eyework in adults.

Curettage and chemical disinfection with mercurochrome is repeated in case of new eruptions or further spreading. Mercurochrome is not a proper remedy for daily treatment, being a cell poison. When the field is once disinfected, I revert to my old treatment before the infectious discovery, with irrigation of the eye with the mildest anti- or cocain drops with adrenalin added to deaden the

pain in the exposed corneal nerves, leaving out all septic solutions and with instillations of holocain bandaging except in certain cases and putting on dark glasses for general protection.

I have expressed as my opinion, that poisonous virus filters from the denuded surfaces to the detriment of the corneal epithelium, the cornea itself and the epithelization. As the virus is virulent, but very perishable once outside its abode, we must provide for its removal and escape from the eye, which we obtain—besides by curetting—by gentle irrigation with a mild antiseptic solution and by leaving out bandaging, which only tends to hold the secretions back. We prefer rather warm antiseptic irrigation or bathing, since we are told that the herpes virus is very sensitive to temperatures. Nature has provided that the eye constantly bathes itself in warm tears, which, as we know, have antiseptic properties; and that mechanism should not be interfered with by bandaging. Bandages are whitened sepulchres. They make an incubator out of the eye, increase and hold back secretions, cause swelling of the margin of the lids, not seldom with entropion of the lower. What bandage is necessary, the eye provides for itself. During day the patient, who always suffers from photophobia, keeps his eye more or less closed, but winks constantly and cleans his eye that way. During sleep the eye is consequently bandaged "in the natural way" and there is therefore more secretion in the eye in the morning than at night. That bandages should favor epithelization (which is claimed) is from my point of view illusory. We are warned against cocain in herpes corneæ because of its destructive influence upon the corneal epithelium. This is a theoretical consideration. I have never seen ill effect from adding a little cocain to solutions I use for instillation and I very seldom notice any epithelial disturbance on normal cornea from a 1 per cent solution and I never go higher. Besides, the epithelial disturbance, if any, is quickly repaired. Some prefer holocain to deaden the corneal pains, but holocain, which is an antiseptic remedy, is more irritating; it acts more quickly than cocain, but is not without injurious effects on the corneal epithelium. Dionin in 5 per cent solution might relieve scleritic and iridocyclitic pains, but I have never found corneal pains relieved—on the contrary. I stick to cocain in herpes corneæ preferably; there is no epithelium in the denuded foci to be hurt and there is no need of hurting the intact epithelium by excessive use of stronger solu-

tions. As cocain in watery solution is not a stable article, I dissolve the cocain in a mild antiseptic solution, to which I add adrenalin to support the effect of the cocain. This composition is popular with my patients.

In the first year of my practice, in 1874, I compounded the following eye-water, which I have used without change ever since, and which I always have in stock. Its formula is:

Boiling Water	1000 grams
Glycerite of Boroglycerine.....	50 grams
Quinine Bisulphate	1 gram
Zinc Sulphate	5 grams
Hydrocyanic Acid, diluted.....	15 grams

Cool and filter.

This acidulated, mildly antiseptic, little irritating, fluorescing, stable solution, I use as such for irrigations, for bath, for instillations and as a menstruum for atropin, homatropin, scopolamin, eserine, pilocarpin, and cocain for preservation of indefinite sterilization of these drugs.

I like to treat my patients ambulatoric; I like to treat them myself twice daily in my office, where I have an equipped operating room with a graduate nurse in attendance; I like to treat them in a recumbent position on a high, narrow, padded operating table, convenient to the patient, nurse and to myself. The patients are all more or less sick after the preceding influenza, which leaves so many with reduced blood-pressure, slow pulse and general weakness, but they are not sick enough to go to hospitals or to stay in bed; they prefer to live in hotels, boarding-houses or with friends or relatives, where they live cheaper, are more independent; where the men can smoke and spit without restriction, discuss the American prohibition, Volstead's $\frac{1}{2}$ per cent dishwater, moonshine and wood-alcohol, and where the women can get all the coffee they want. I will on this occasion put myself on record as most emphatically disapproving of sick people, by a senseless prohibition, being deprived of the benefit of getting good beer and good wines, which they greatly need and which the most of them would highly appreciate. I don't feel the same way towards whiskey, which it is in my power to prescribe if I should take out the necessary license; this, I purposely have not done, because the inferior drug-store whiskey is not worth its price and because I have a good substitute, which is both cheaper and better and which I prescribe both for men and women. Its formula is:

Tinct. Nux Vomic.....gram 50
 Acid Phosphoric Dil.....gram 100
 Tinct. Gentian Comp.....ad. 500

Sig. One teaspoonful in a wine glass of water before meals. This prescription is my favorite substitute for beer, wines and whiskey, but it tastes differently; the patients take it but do not enjoy it and it does not produce the immediate content that beer, wines and whiskey do.

It depends upon the severity and virulency of the neuritis whether herpes corneæ is a mild one of a couple of weeks' duration or a severe one, lasting months. It also depends upon when the patient comes to treatment and—last, but not least—on the treatment itself. Ordinarily, the prognosis as to the conservation of good, useful, binocular vision is good, if we can prevent corneal destruction and secondary infection, which I think a rational treatment, based upon correct diagnosis, will do. Upon the severity and virulence of the neuritis the reparation of the corneal sensibility also depends and also, I believe, the frequency of relapses. The immunity after herpes corneæ is not lasting and the patients might return with relapses year after year. These relapses are, however, always of a milder type. It happens off and on that I am consulted for quiet unilateral corneal opacities which I can trace back to a once herpes corneæ because of reduced sensibility of the cornea. In severe cases, particularly after herpes zoster, the patients are for a long time troubled with abnormal sensations in the eye (paresthesia). Complete anesthesia, with destruction of the eye from neuroparalytic keratitis, I have never seen after herpes corneæ, so far as I remember. But during my long career it may have happened, that in earlier days I have enucleated blind, painful, degenerated eyes without having recognized the herpetic start of the trouble.

As yet I have not wasted any time on atropin, because it is entirely useless in corneal diseases except in cases of increased pressure upon the cornea from blepharospasm, which, however, seldom is pronounced in herpetic keratitis. If the patient should exercise an undue pressure on the diseased cornea by pinching of the lids, a full dilatation of the pupil by atropin, which means rest to the iris and ciliary body, will here, as it so often happens in children with blepharospasm for scrofular keratitis, reflect upon the spasm of the orbicular muscle. The best remedy for blepharospasm, canthotomy, was never resorted to or necessary in herpetic keratitis.

In the frequent complications of herpes corneæ with herpetic iritis, atropin comes to its right, not because it has any influence whatsoever on the iritis itself, but because it by dilating the pupil should prevent the formation and organization of posterior synechia and because it, in presence of already existing synechia, in combination with cocain will not only paralyze the sphincter but also stimulate the dilator and thus exercise an actual pull on the synechia, which will break them up in fresh cases.

In full dilatation by atropin in herpetic iritis, the iris and ciliary body is consequently at rest—a good surgical principle in inflammatory diseases—but the inflammation goes on all the same in spite of the “rest cure.” If the dilatation is tried by atropin and cocain in conjunction, the rest cure is partly interrupted, as there is active pulling from both sides, on the synechias as well as on the root of the iris, which is so far advantageous, as it helps pulling the iris away from the filtration angle and actually helps the filtration.

In the earlier days we thought that atropin by its dilatation of the pupil brought about a compression of the pupil with depletion of the hyperemic condition, both arterial and venous, with antiphlogistic effect and reduction of the tension. This is entirely erroneous. In dilated condition the iris is simply folded upon itself and it weighs precisely the same as before the dilatation.

While dilatation with atropin under normal circumstances does not bring about any noticeable change in the intraocular tension, it is a notorious fact that full dilatation in acute irido-cyclitis often-times increases the intraocular tension and the misery of the patient by crowding the iris towards the filtration angle and blocking up the drainage more or less. This is, at least, what most of us believe at the present time, and this, I am sure, everybody has noticed. Under such circumstances many of us shift from atropin to eserine for a couple of days with relief to the patient and reduction of the hypertension, although the rest-cure is interrupted. The herpetic uveitis is, however, not of the acute type; it is chronic, but sometimes with acute exacerbation, and we have all we can do to prevent and break up posterior synechia, if it is at all possible, so there seldom will be any call on temporary miotica. In herpes cornea we must always be on the lookout for a complicating iritis, but not trouble the patient with atropin unnecessarily, because of the inconvenience of loss of accommodation and dazzled sight, which, however, is of minor importance in

the presence of a keratitis. Of greater importance is it to recognize the iritis so early that full dilatation is both possible and easy. Therefore, a diagnostic dose of atropin or, still better, of homatropin is often advisable, as it may be difficult to judge the condition of the iris through the more or less translucent cornea.

If iritis appears and the pupil dilates irregularly with atropin, atropinization should be pushed vigorously to full dilatation. We must remember that a diseased, more or less translucent cornea retards the absorption of atropin into the anterior chamber and, also, that we probably get better effect with instillations of drops in recumbent position with pressure on the lacrymal ducts and sac to prevent its absorption into the nose and throat. If repeated instillations of a 1 or 2 per cent atropin and cocain solution in the above mentioned eye-water should not accomplish full dilatation, I, for my part, use next 2 per cent atropin-alkaloid in castor oil or even the dry atropin powder. If posterior synechiæ form and organize in spite of such heroic treatment, it is not our fault and it is useless, or even hurtful to the conjunctiva and irritating to the iris, to push atropin any further. Dr. Frank Burch of St. Paul, who is probably known to all my prospective readers, tells me he has had prompt action in breaking up synechiæ by subconjunctival injection of a drop of 10 per cent cocain solution and atropin powder in the conjunctival sac. When the pupil is fully dilated, only enough atropin should be used to keep it dilated.

The routine I follow in the treatment of herpes corneæ runs at present thus: After having given the patient the before mentioned dope and anesthetized the cornea with 1 per cent cocain or holocain or both, I curette the vesicles, shreds, and spreads, flush the entire eye with 2 per cent mercurochrome solution, apply a light anointed pad and ask him to report in the afternoon. The pad is then removed, the eye irrigated with the above eye-water with a spacious dropper, whereafter a few drops of the following solution is instilled.

Rp. Boeckmann's eye-water.....10 grams
Adrenalin 5 grams
Cocaini muriatici 0.15 grams

He is now provided with darkened glasses, which he leaves off for the night. The same treatment is repeated twice daily. Only in cases of new eruptions or spreading—a not common occurrence—is

curettage and mercurochrome repeated. Atropin is used in iritic complications. The patients are advised to use hot water applications at intervals.

The intraocular tension in herpes corneæ is, as a rule, either normal or reduced. In case of increase, I do not hesitate in making paracentesis, which might be of some relief after the initial increase in tension, which always follows paracentesis for a day or two, subsides. Subconjunctival injections I have never resorted to; have in fact not much use for them; there is misery enough without them. Neither has anybody ever advocated them.

When the epithelization at last is completed and the pains gone, our work is practically done and the patients ready to be discharged. Still, nature has a long repair work to do for the nerves and the corneal sequelæ. It is no proof of the inflammation being over, that the eye is apparently at rest, the ciliary injection gone and the patient feeling tolerably well. We still have a keratitis, not only an opacity or a scar before us. Separate the lids and expose the eye to the air and the ciliary injection will promptly return. Compare with the other eye and you will see the difference.

When there is a sequela in the shape of nebula, nebula, macula, or leucoma, the corneal inflammation is ended, but the corneal opacity will continue to clear up through months and years. As long as we, by exposure, can demonstrate the latency of the keratitis, treatment should be continued at home for so long a time as the patient has patience to keep on and thinks it beneficial. I give them to take along a small bottle of cocain-adrenalin-eye-water solution—not a large one, because the solution reddens and loses its efficacy as a comforting remedy. But, I particularly give them some 10 per cent noviform ointment, with which to massage the cornea after having inserted some, by the aid of a glass applicator, in the conjunctival sac, which they soon learn. The affected nerves will have to take care of themselves; “vis medicatrix naturæ” is after all the doctor's and the patient's best friend. And it is wonderful how the opacities will clear up in time. Extensive iritic synechia may need more than nature's help—surgical interference.

I am indebted to Dr. Paul Berrisford and Dr. Frank Burch, both of St. Paul, for suggestions and patience with my English.

SUMMARY OF RECENT PROGRESS IN UROLOGY*

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During the last year or two there have been a number of interesting advances in the field of urology. It is my purpose to give a brief summary of the more important phases of the subject which have interested us at the Mayo Clinic.

Submucous ulcer of the bladder.—Among the contributions to the subject of urology which have caused the most widespread discussion is that by Hunner concerning submucous ulcer of the bladder. His claims have been largely substantiated and he deserves credit for calling our attention to the existence of a type of localized chronic submucous infection of the bladder which had heretofore been overlooked. To call the condition "ulcer" is somewhat unfortunate, however, since there is little evidence of actual ulceration in the mucosa of the bladder. Through the cystoscope the lesion appears as an irregular area of congestion, with cicatricial changes, which bleeds easily and may be very sensitive to touch. The area may be quite difficult to find, requiring a careful search with both lens and direct vision cystoscope. Strangely enough, the condition is most often found in women, and usually in the upper portion of the bladder. It is evidently the end result of a primary pyelonephritis and cystitis, although it may be a specific hematogenous infection of the submucous tissues in the bladder, as Bumpus and Meisser claim. The factors contraindicating operation are: persistence of renal infection, diffuse cystitis, and multiple areas of submucous infection scattered in various portions of the bladder. Before advising operation an attempt should be made to treat the areas with topical applications of silver nitrate and fulguration. Postoperative results have not been uniformly successful. Although almost every patient improved immediately after operation, many suffered a recurrence of symptoms at the end of from three to six months. A cure is, therefore, not certain until at least six months have elapsed after operation. Of equal importance to resection of the diseased area is the thorough removal of all possible

foci of infection, usually infected teeth and tonsils. The etiologic relation of these has been quite definitely shown experimentally by Bumpus and Meisser.

Wide stricture of the ureter.—Observations made by Hunner with regard to stricture of the ureter have not been generally substantiated. A wide stricture of the ureter may occasionally exist, but it is not found nearly so often as has been claimed. The so-called hang to the wax bulb on the ureteral catheter which has been described at the site of the suspected stricture can be explained by physiologic and anatomic reasons. Failure to demonstrate the existence of dilatation of the ureter and renal pelvis above the so-called stricture is a large factor in negating the hypothesis.

Stone in the ureter.—In recent years, stone in the ureter has been regarded more and more as a condition in which the stone either passes spontaneously, or is removed with the aid of the cystoscope rather than by surgery. Crowell has taken the extreme position stating that it is seldom necessary to operate for stone in the ureter. He has found it necessary only twice in a series of seventy-eight cases. A more conservative position is taken by Bugbee, who reports a series of 120 cases with operations in about twenty-five. In the Mayo Clinic it has been necessary to resort to operation in approximately 25 per cent of such cases.

The technic for the removal of stones by the aid of the cystoscope has been steadily progressing during the last few years. Besides displacing the stone by the manipulation of the ureteral catheter, probably the most important factor is the prolonged dilatation of the ureter which may be accomplished best by means of multiple indwelling ureteral catheters, as suggested by Crowell. A fair sized ureteral catheter is introduced into the ureter past the stone and is left in place for several days. Subsequently one or two catheters are inserted into the ureter along the side of the original catheter. These also remain in place for a day or two, when they are removed. As a result of this dilatation the stone usually is expelled during subsequent colic. Bugbee employs an ingenious method of inserting a soft ureteral catheter in such a manner as to wind it around the stone, thereby obtaining considerable traction. The use of papaverin, a derivative of opium, suggested by Macht, which paralyzes temporarily the smooth muscle fibers of the ureter, has been advocated by several observers. The value of

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drugs is more or less questionable, although they occasionally seem to be of some aid.

Focal infection of the urinary tract.—It has been generally recognized that foci of infection, for example those in the teeth and tonsils, may play an important part in the cause of infections of the urinary tract, and it has been the custom of careful clinicians to search for such foci and remove them when present. The importance of this has been emphasized by the work of Rosenow, and more recently by the experimental studies of Bumpus and Meisser, who injected into rabbits streptococci from the cultures obtained from diseased teeth and tonsils of patients with infections of the urinary tract, and produced infections similar to the original infection in the patient. For instance, in a case of chronic bilateral pyelonephritis, similar lesions in the kidneys of many rabbits were produced. In cases of submucous ulcer of the bladder they were able to reproduce similar lesions in the rabbit. The experimental corroboration of these theories is certainly of considerable clinical value and manifests the great importance of roentgenographic examination of the teeth, examination of the tonsils, and their removal should any evidence of infection be found.

It seems logical to conclude that, since bacteria are the direct etiologic factors in the formation of cholecystitis and gallstones, as shown by Rosenow, they should also be etiologic factors in the formation of urinary stones. Streptococci obtained from culture of the urine of a patient suffering from recurring lithiasis and injected into the pulps of teeth in six dogs caused the formation of renal stone in five. Alkaline phosphatic cystitis is the clinical condition which offers the most definite evidence that lithiasis has a bacteriologic origin. Meisser has recently demonstrated the formation of a phosphatic concretion in the bladder of a rabbit injected with streptococci obtained from an infected tooth of a patient suffering from alkaline phosphatic cystitis. It seems probable, however, that more than one factor is involved, since the chemical changes may be of equal etiologic importance. Keyser has been able to repeat the experiments made by Ebstein and Nicolaier, who produced urinary calculi in dogs and rabbits by the administration of oxamid. He found that a piece of dead muscle tissue, left in the pelvis of a dog's kidney for several months, became covered by a calcareous deposit, and concludes that urinary stasis is an important element in the formation of calculi.

The exact relation of chemical changes to bac-

teriologic infection remains obscure, but recent evidence leads us to believe that we may be on the way to unravel some of the mystery that surrounds the subject. In any event it would seem logical to conclude that infections in the teeth and tonsils should be regarded as very probable factors in the cause of lithiasis and should be carefully removed in order to prevent recurrence.

Value of radium in the urinary tract.—Radium applied in diseases of the genito-urinary tract has not met with the success hoped for. Encouraging reports of evident cure from observers who first used radium in the treatment of carcinoma of the prostate have not been corroborated by later experience. It is, however, often of palliative value and in many cases seems to retard the progress of the malignancy. Of the various methods of applying radium to the prostate, probably the most efficacious is the insertion of needles containing radium emanation. As described by Barringer these needles are injected through the perineum directly into the prostatic tissue. The suprapubic insertion of the needles following preliminary cystotomy, as described by Herbst, hardly seems necessary as a routine procedure. Radium applied through the rectum often causes considerable reaction. We have secured the best effects by thorough radiation of the prostatic tissue from all angles; that is, by applying the radium in needles directly into the prostatic tissues through the perineum, as well as by means of protected capsules inserted into the rectum and urethra. In using needles a comparatively small dosage is necessary and care must be taken that they are not inserted too close together. If there is insufficient space between the needles and if the dose is too great the prostatic tissue will slough. Our experience has demonstrated that radium should be given only in selected cases, and if there is evidence of extension beyond the prostatic gland, or of metastasis, radium therapy is of little value.

Bumpus has shown that one-third of the patients in the Mayo Clinic who have carcinoma of the prostate have metastasis to the bone. This was discovered by careful roentgen-ray examination of the entire spine, pelvis, and long bones. Many of the patients had little or no subjective or objective evidence of metastasis. Although the prostate often is markedly reduced in size as the result of radium, and may even disappear on rectal palpation, nevertheless, the degree of urinary obstruction is usually little diminished. In such cases, if the patients'

general condition and extent of prostatic involvement warrant, suprapubic removal of the obstructing portion of the gland may be indicated.

The use of radium as a primary measure in the treatment of carcinoma of the bladder has proved to be of value in some cases. It may, however, be employed to greatest advantage in conjunction with surgical measures. We now insert, through the cystoscope, directly into the growth and particularly into its borders, numerous minute glass tubes containing radium emanation. This is done preferably from two to three weeks before operation and as a result the neoplasm is often found contracted and fibrosed with well demarcated borders. During the period between the insertion of the radium emanation and the surgical removal of the growth the bladder is washed daily. This not only removes the slough from the radiated tumor, but also reduces the infection so commonly associated with malignancy of the bladder. Radium in these cases is used with the intention not of completely destroying the growth, but of reducing the potential malignancy of fragments not removed or those scattered through the bladder during resection of the growth. Radium applied to the site of operation following resection delays healing and has occasionally caused sloughing of the tissues with serious results; this should be done cautiously if at all.

Epithelioma of the bladder.—Broders has studied a large number of epitheliomas and classified them according to the degree of malignancy. The extent of the malignancy varies inversely with the degree of differentiation of the malignant cells, or the degree of approximation to the normal cell type. Tumors composed of cells which have structural characteristics similar to the surrounding normal cells are generally of a low degree of malignancy. Malignant papillomas of the bladder which have a cell structure and definition often approximating that of the surface of the bladder, are generally of a much lower degree of malignancy than the structureless masses of irregular cells found in solid epitheliomas. These tumors are graded on a basis of 1 to 4, 4 being the most malignant; the majority of malignant papillomas fall in Grades 1 and 2; the solid epitheliomas and carcinomas in Grades 3 and 4. This is of distinctive prognostic importance, as the immediate operative mortality and the percentage of recurrence vary directly with the grade of malignancy. Scholl has recently reported

from the Clinic a number of cases of squamous-cell epitheliomas of the bladder, stating that in spite of their high degree of differentiation they are extremely malignant and rapidly fatal.

Caudal anesthesia.—The methods of regional anesthesia introduced by Labat are of value to urology from a surgical as well as clinical standpoint. The so-called caudal anesthesia recently described by Scholl, is now employed at the Mayo Clinic for cystoscopy in all cases of intolerant bladders. Such anesthesia has been employed in the Clinic in several hundred cases in which extensive manipulation has been necessary, such as fulguration, litholapaxy, dilatation of strictures of the urethra, and the insertion of radium needles into the prostate without any serious consequences and the relief from suffering which it has afforded has made the procedure well worth while. Owing to refinement of technic there is no difficulty in inducing the anesthesia with the patient on the cystoscopic table, and without much delay.

Pyleographic mediums.—Doubtless most of you are familiar with the advances that have been made in the use of pyleographic mediums. Sodium bromid, suggested by Weld, has proved to be very satisfactory. It seems to cause less irritation than some of the other mediums, it is not toxic, and the resulting shadow is as dense as any other.

Decompression of the bladder.—The effect on the kidneys of the sudden emptying of a distended bladder has been widely discussed. The principle involved is of the greatest importance in cases of distended bladders resulting from prostatic obstruction. It has been claimed by some observers that uremia and death which may occur following the sudden emptying of the distended bladder is explained by the resulting congestion of the kidneys. It was claimed that such congestion might be obviated if the bladder were emptied gradually in order to give the kidneys a chance to regain the normal balance of urinary pressure. This theory has, however, been denied emphatically by others. It has been our experience that the sudden complete drainage of the bladder by suprapubic drainage or by insertion of a urethral catheter was accompanied by a high mortality rate. Withdrawing but part of the bladder contents or replacing the urine which was drained by boric acid solution, did not always overcome the serious results. Van Zwalenburg, in a recent article, described a rather ingenious device

which permits gradual decompression of the bladder. We have applied this method, as described by Foulds, in about 100 cases, with one death. It is remarkable how well the gradual complete emptying of the bladder was borne by the patients. Scarcely any injurious results have been noted, and practically all of the patients have shown evidence of restoration of renal function. The technic is as follows:

"The patient is placed in a hospital and made comfortable in a warm bed. A soft rubber catheter is introduced into the bladder with all aseptic precautions and fastened in place without permitting the escape of urine. This procedure is possible except in occasional cases in which the catheter must be passed on a metal guide. In these cases a minimal loss of urine occurs, usually from 10 to 15 c.c. The catheter is then connected to a six-foot rubber tube which is connected at its distal end with one arm of a Y glass tube. The other arm of the Y tube is hooked over the edge of a receptacle hung at the foot of the bed. When all is connected the clamp is removed from the catheter and the height of the urine receptacle is adjusted to a level at which the urine will just trickle over into it on deep inspiration. The tube is clamped when the patient is fed and bathed, or when any movement is to be undertaken which will disturb the relative level of the bladder and the outlet. The receptacle is lowered 2.5 cm. each day until the bladder has emptied itself or until the level of the outlet is approximately that of the bladder. When this level is reached the bladder is usually almost, if not quite, empty. However, if 100 or 200 c.c. of urine remain, the intravesical pressure is reduced to nil and there is no danger in completely emptying the bladder."

*Renal fluoroscopy*².—Renal fluoroscopy at the time of operation for renal stone has proved to be of great practical value. This procedure is an adaptation of the portable army roentgen-ray unit so that it can be employed at the operating table. The surgical treatment of renal lithiasis is often unsatisfactory because of complications: (1) The difficulty of exactly interpreting the roentgenogram, (2) the difficulty of locating the stone in the kidney, (3) the inability to find the stone, and (4) the possibility of fragments of stones breaking off or being loosely connected with the original stone. By employing fluoroscopy of the kidney at the operating table these difficulties, with the embarrassing results of failure, may readily be obviated. The kidney

is brought up out of the wound as far as possible, thus permitting easy fluoroscopy. In about fifty operations in which the method has been tried it has proved to be of considerable practical value. In several instances the stone was not found in the kidney until detected by the fluoroscope. In two instances the fluoroscope demonstrated that a stone clinically diagnosed as intrarenal was extrarenal. In several cases after one or more stones had been removed additional stones were demonstrated.

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TREATMENT OF DUODENAL AND GASTRIC ULCERS*

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Ulcers of the duodenum and stomach are neither exclusively medical nor exclusively surgical. The treatment indicated depends upon the type, size, stage of the development of the ulcer and the presence or absence of complications.

All uncomplicated, acute ulcers and the majority of ulcers recognized at an early stage should be treated medically. The medical treatment, in order to be designated successful, should be followed by complete and permanent cure. The medical treatment in a measure constitutes a therapeutic test of the correctness of the diagnosis, in that uncomplicated ulcers of an appropriate type respond promptly. The medical treatment sorts the ulcers into medical and surgical cases. Medical failures and temporary or incomplete cures obtain in the type of ulcer requiring surgery and when the diagnosis is incomplete or incorrect. The cases designated as being incomplete in the diagnosis are the cases having co-existing lesions in the gall bladder, appendix, pancreas or other organs. Obviously, the patient can not be completely cured until all of the lesions have been eradicated. The complication of an accompanying chronic cholecystitis, cholelithiasis, or appendicitis, makes the ulcer case a surgical one. Cases diagnosticated as ulcer and treated medically without success, not infrequently fail to disclose an ulcer at operation. Careful exploration of the abdominal contents will disclose pathological lesions of the gall bladder, appendix, pancreas, liver, spleen, etc. The mimicry of ulcer symptoms by these various lesions is well recognized. Even the x-ray findings of a gall bladder adherent to the duodenum are most confusing. Copious hematemesis in cases of gall bladder, appendix, liver or spleen pathology without lesions in the stomach or duodenum occur. The gastric analysis may be most misleading. Of one hundred cases of ulcer of the duodenum, ulcer of the stomach, carcinoma of the stomach, treated at the University Hospital this past year, twenty per cent of the carcinomata had free hydrochloric, and

had hypoacidity and anacidity.

twenty-eight per cent of the ulcers of the duodenum

Etiology.—In conjunction with other factors, the chief direct cause of ulcer is probably sepsis, a streptococcic hematogenous infection not infrequently causing infection of the gall bladder, appendix, pancreas, kidney and various other lesions, most of which clear up, the ulcer, gall bladder, or appendix, any one, two, or all three remaining permanently damaged. This conception explains the complicated pathologic findings presented in the commonly complicated ulcer cases. The clearing up of all primary and secondary foci of infection is, of course, absolutely essential to success.

Symptomatology.—The uncomplicated ulcer manifests itself by secondary and indirect symptoms, consisting of pyloric spasm, hyperactivity of the pyloric end of the stomach, and in some cases hyperacidity and hypersecretion. The uncomplicated ulcer itself gives no direct symptoms. We must remember in considering our results that the majority of untreated ulcers have remissions and periods of quiescence.

The medical treatment of ulcer usually results in obtaining complete relief of the ulcer symptoms. The internist believes that he has obtained a cure in such a case. Operation on such persons may disclose the presence of an unhealed, active ulcer. This is the class of cases which has recurrence of symptoms. Likewise gastroenterostomy alone upon a surgical type of ulcer gives relief of symptoms in a large percentage of cases, and yet if the patient



Fig. 1. Photomicrograph. Chronic gastric ulcer with final malignant degeneration. Eight year history of periodicity of symptoms, hematemesis, epigastric pain two hours after meals, relieved by the taking of food, alkalies, or by vomiting. Section taken from the base of ulcer shows mass of dense connective tissue diffusely infiltrated with glandular epithelium in nodes, cords and a few in well formed gland formation, and show a moderate number of mitotic figures. The edge of the section shows carcinomatous change. The whole ulcer bearing structure shows diffuse round-cell infiltration.

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be reoperated the ulcer may be found present and active.

The so-called successful treatment of many of these ulcers, particularly the chronic calloused ulcer, has probably consisted in the relief alone of the secondary symptoms, the ulcer itself remaining practically unchanged. True healing of the ulcer and the relief of the secondary symptoms are two different considerations. The real cure of ulcer requires not alone the relief of the symptoms but the healing or eradication of the ulcer. Gastroenterostomy relieves the pyloric spasm, ensures more rapid emptying and mechanically drains the results of the hyperacidity and hypersecretion. The inflow into the stomach from the duodenum of bile, pancreatic juice and Brunner's glands' secretion, in a measure assists in the neutralization of the gastric acids, as a consequence of all of which the ulcer becomes symptomless. This constitutes the surgical application of the same principles of treatment as practiced by the Sippy school, the chemical neutralization of the gastric secretion by the patient's own alkalies, the removal of the hypersecretion when present by the gastroenterostomy drainage, thereby controlling the peptic and corrosive action. Gastroenterostomy reduces the free acids between forty and fifty per cent, and the combined acids thirty to forty per cent.

Surgical treatment of ulcer of the duodenum and stomach.—Pyloric obstruction was the original indication for gastroenterostomy. Scar tissue obstruction usually constitutes a healed ulcer, and gastroenterostomy is eminently satisfactory under these circumstances. Gastroenterostomy still con-

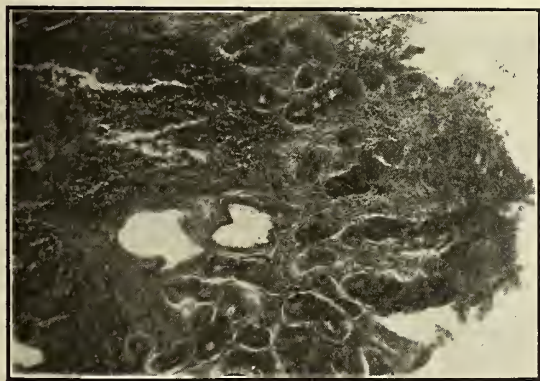


Fig. 2. Photomicrograph. Benign, obstructing pyloric ulcer, treated by excision of the ulcer and the performance of a pyloroplasty to overcome the obstruction. Section shows base and margin of ulcerating gastric tissue. Base shows diffuse round-cell infiltration with slight connective tissue proliferation. Mucosa and submucosa show marked cellular infiltration but no evidence of malignancy.

tinues to be the mainstay in the treatment of gastric and duodenal ulcers requiring surgery. It is particularly indicated in cases of high hyperacidity. The operation is, however, unanatomical and unphysiological and should only be performed under protest. The eradication of a lesion is always a great satisfaction to the surgeon. The healed ulcer, if of considerable size, probably constitutes a locus minoris resistentiæ, does not enjoy the wonderful resistance of the normal mucous membrane, and is more liable to break down again. The definite percentage of malignant degeneration of gastric ulcers is an additional reason for the resection of this latter lesion. Hemorrhage and perforation, as complications, are likewise nullified by excision. Excision of the calloused ulcer should be combined with gastroenterostomy practically always when operatively feasible. Small calloused ulcers of the duodenum in which marked cicatricial deformity or obstruction is absent may frequently be excised without the performance of gastroenterostomy, particularly in the absence of high hyperacidity. The great majority of duodenal ulcers occur in the first portion of the duodenum, that is, between the pylorus and the entrance of the common duct. Transverse excision of the ulcer and suturing should be performed. Perforation of the ulcer, infolding of the ulcer and simple gastroenterostomy without infolding of the ulcer, are at times followed by a cure, as personally verified by secondary operations for gall-stones, postoperative hernia, and the like. Ulcer of the duodenum or stomach, particularly with low acidity, may at times be appropriately treated by resection and the performance of a plastic closure of the Finney type. The merit of the Finney types of operation has not been properly appreciated. Many gastric ulcers may be appropriately treated by excision alone. Edema and inflammation surrounding an ulcer which is acutely infected, contraindicate excision, under which circumstances the tissues at times will not hold the sutures. This complication can frequently be relieved by adequate preoperative treatment, or be relieved by gastroenterostomy, the excision of the ulcer being performed at a second operation. Close proximity to the common duct or posterior wall location are contraindications to excision. This secondary resection is indicated in some of the "incompletes" following gastroenterostomy. Pylorectomy may be performed when eradication of the ulcer or ulcers is indicated and simple excision would result in too great deformity. It

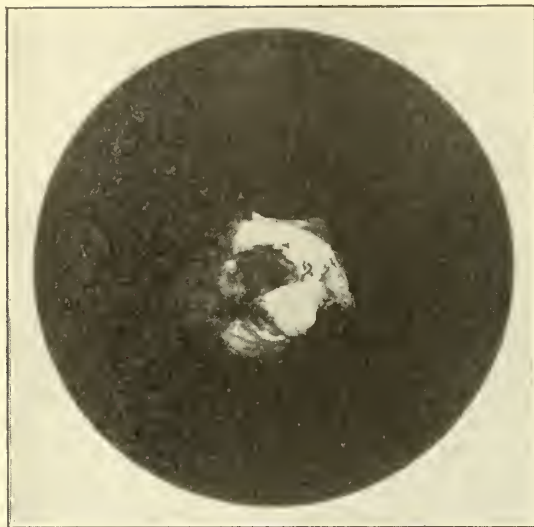


Fig. 3. Photograph. Benign gastric ulcer, removed by simple excision without the performance of gastroenterostomy.

is one of the, if not the, most satisfactory of gastric operations performed and should be more frequently employed. With greater experience in the simple resection of ulcers an increasing resectibility will be found, and a decreasing performance of gastroenterostomy will follow.

No type of surgical intervention is to be performed upon the stomach or duodenum unless the ulcer can be actually demonstrated at the time of operation. This demonstration may require incision into the duodenum or stomach, but uncomplicated ulcers which can not be palpated are usually medically curable and should never come to the operating table. The introduction of an electrically lighted endoscope (proctoscope) into the stomach and duodenum through a gastrotomy has been of assistance in locating an ulcer. Gastroenterostomy performed in the absence of appropriate indication usually increases the patient's disability and should be taken down. Careful exploration of the abdominal contents in other cases not infrequently discloses lesions of the appendix, gall bladder, etc., requiring attention.

The medical treatment in cases with pyloric obstruction should not be persisted in until atony, dilatation and irreparable damage to the stomach, both on the motor and mechanical sides, occur.

Classification of ulcers:

1. Soft lesion, relatively small, superficial, no deeper than submucosa; absence of surrounding induration; benign clinical course, usually cured by medical treatment.

2. Large size, deep penetration, frequently perforating; marked induration, scar tissue, margin of connective tissue and resultant anemia constitute serious obstacle to healing. Surrounding edema; margin comparable to leg ulcer or sclerosis around bone abscess. Requires resection or eradication with cautery.
3. Small ulcer, localized with scar and readily resectible.
4. Duodenitis, as recently described by Judd. Stippling, congestion, edema, thickening present but no scar; no gross loss of mucous membrane; no crater, but multiple very small ulcerations present and leucocytic infiltration.

Ulcers are not infrequently multiple, though only one be palpable or visible. Ulcers of the duodenum and ulcer of the stomach occasionally co-exist.

Preoperative medical preparation and postoperative medical care are equally important to the surgical intervention of ulcer of the duodenum and stomach, and have been greatly neglected. Thorough preoperative preparation makes possible the primary resection of certain ulcers which would otherwise be non-resectible. Rest is a sovereign remedy and its therapeutic value should be more employed by the surgeon. One of the greatest absurdities of surgical practice is the common one of sending the patient, some several weeks after an operation for ulcer of the duodenum, back to the ranks and habits of the normal individual.

The technical details in various surgical procedures for ulcer, the location and size of the stoma, suture materials, the separate and accurate suturing of the mucous membrane layer, the avoidance of the postoperative gastric deformity, etc., are all of paramount importance. Scrupulous attention to the minutest details is absolutely essential to success. The medical and surgical treatment of ulcer in their appropriate fields neither yield one hundred per cent cures, but better results are being obtained in both fields. Perfection is the exception in this world.

The present distrust on the part of the surgeons and internists is due to the fact that each group is seeing more of one another's failures than of the successes. The medical failures go to the surgeon, and the operative failures to the internist; the successes in both fields go to neither. This truth absolutely unbalances so-called statistics. The treatment of ulcer of the duodenum and stomach calls for the very closest and sympathetic co-operation,

not competition, of the medical practitioner and surgeon, each of whom should be thoroughly familiar with the indications and limitations of both fields.

DISCUSSION ON THE PAPER OF DR. A. C. STRACHAUER

DR. VERNE C. HUNT, Rochester: We are very much indebted to Doctor Strachauer for his excellent presentation of the subject of treatment of duodenal and gastric ulcer. I would like to emphasize a few of the points he has made. Incomplete relief obtained in some cases by surgical treatment is often due to an inadequate operation. We often see, at the operating table, not only a lesion of the stomach or duodenum, but associated with it a lesion of the gall-bladder or appendix. Simply to take care of the ulcer by some surgical method, excision, gastroenterostomy or pyloroplasty, without the removal of the diseased gall-bladder or appendix, will not afford the patient complete relief.

Another source of failure is the operative procedure on the stomach, chiefly gastroenterostomy, in the absence of any lesion of the stomach or duodenum. In these cases there have been a great many failures, and gastroenterostomies have been performed and undone; however, such cases, in the absence of ulcer, should not discredit the surgical treatment of actual ulcers. As Doctor Strachauer stated, the good surgical results neither go back to the surgeon nor to the internist; it is only the surgical failures that return for further consideration.

In the treatment of gastric and duodenal ulcers we must distinguish between the medical and surgical ulcer. The medical ulcer, or mucous membrane lesion, is usually amenable to medical treatment, while callous ulcer of the stomach or duodenum is a surgical lesion.

There are many surgical procedures in the treatment of duodenal and gastric ulcers, and the question of the type of operation depends on the type of ulcer, its location, etc. There are quite definite indications for excision. Ulcers of the stomach, whenever possible, should be excised on account of the frequency of hemorrhage and the potential malignancy of ulcers on the gastric side of the pylorus. Balfour reviewed something over 800 cases of gastric ulcers two years ago, and in 25 per cent of these there was a history of gross hemorrhage before operation. Chiefly because of the large percentage of hemorrhage, it is a distinct indication for excision. In duodenal ulcers, potential malignancy does not exist. However, here again hemorrhage, which occurs in 20 per cent of cases, is a distinct indication for excision when possible. Balfour showed that gastroenterostomy alone in bleeding duodenal ulcers did not always control the bleeding from the ulcer.

Another type of duodenal ulcer in which excision is particularly indicated is the one in which the acids of the stomach are normal. In these some type of pyloroplasty may be done, and good results obtained without gastroenterostomy.

Taking the cases of duodenal and gastric ulcers as a whole, it seems to me the operation of gastroenterostomy is probably the one uniformly applicable to most lesions along with excision of all gastric ulcers and all bleeding duodenal ulcers.

To obtain the best results in the treatment of gastric and

duodenal ulcers requires the co-operation of the internist and surgeon, for probably few ulcers are wholly surgical or wholly medical.

DR. ARCHIBALD MACLAREN, St. Paul: I congratulate the association on having heard Dr. Strachauer's interesting paper and Dr. Hunt's excellent discussion. I jotted down several things to which he has referred. Many of our early cases of gastroenterostomy were often made worse because they never had ulcer and ought not to have had a gastroenterostomy in the first place; and such patients are never relieved until their twisted intestinal canals are straightened out again.

Dr. Strachauer touched upon the point of acute perforation. I had seen quite a number of acute perforations before Deaver took the stand that we always ought to combine gastroenterostomy with closure of the acute perforated ulcer. Before Dr. Deaver's first article on this subject was published I had already had quite a number that got perfectly well and stayed well for a number of years. Consequently I have never been able to follow Deaver in that regard, although he has continued to hold the position that the gastroenterostomy should be combined with the closure of an acute perforated ulcer.

The modern x-ray has recently helped me very much in the diagnosis of chronic gastric and duodenal ulcer; it did not help much for a long time. I could not interpret these x-rays, so I had to take the word of the roentgenologist that he could see the ulcer. But rather recently I have seen several. They are usually of the long standing chronic type, the kind that the medical cure does not help. You can quiet these ulcers down for a time but they soon relapse. One patient with a large callous ulcer, with a history of nine years' standing, had had six medical cures. Relief came with great irregularity. But as soon as there was the slightest indiscretion in diet, back would come all the old symptoms. There is absolutely no sense in subjecting these people to additional cures. Their cases are purely surgical and they can only get permanently well by a surgical cure.

DR. J. W. ANDREWS, Mankato: I have to look back only a few years to the time when, in any medical society where internists and surgeons were gathered together, discussions upon this very subject were frequent. First, surgeons took the position that all ulcers of the stomach or duodenum required operative treatment; that these cases belonged to the surgeon. The internist would claim that he could cure all by medical management. Now I think a happy medium has been reached.

I was much pleased with the paper of the evening coming from a surgeon who says that some of these cases are surgical and some of them are medical. If there is an ulcer in the pyloric end of the stomach, hugging closely up to the pylorus, if it is not cicatricial it is very likely to become so, and if cicatricial it is likely to produce obstruction because of that cicatrix. The case then is certainly obstructive and should be operated on. We very often get obstructions.

Let me say that the duodenum will not tolerate strong acid food thrown into it, and so on. If the stomach is very strongly acid, when the bolus of food comes near the pyloric end, nature throws it back and will continue to throw it back; consequently we have an obstruction, but not necessarily an obstruction requiring gastroenterostomy. Gastro-

enterostomy will only afford temporary relief, and such a case is purely medical and should be treated medically.

Some years ago I operated on a number of cases of ulcer of the stomach and duodenum by gastroenterostomy, and I was pleased with my results. I thought I was having splendid success, but I found after some months or a year or so the patients returned with the same symptoms; then I naturally asked myself the question after I had done this operation, why it was I was getting patients from eminent surgeons who had performed gastroenterostomies on patients and in whom the symptoms had returned. I finally came to the conclusion, after treating a good many of them medically, that the average ulcer in the majority of cases, duodenal or gastric, can be cured with medicine and should not go to the surgeon. It is not always true that we have a strong acidity of the stomach. I have seen several cases of ulcers of the stomach in which there was hypoacidity. I have had several ulcers of the stomach and duodenum where the acid condition of the stomach was normal, so that a test meal and a chemical analysis of the test meal is not so reliable after all. But we now have means, I think, of diagnosing in the majority of cases the presence of duodenal or stomach ulcer by the fluoroscope and the barium meal. If we rely upon symptoms we are often misled.

One of my colleagues in the last year has been doing splendid work in duodenal drainage—Dr. Lloyd, of this city, and we have found that where there were symptoms of ulcer there was a streptococcic condition in the gall-bladder or the liver, or duodenum at any rate, and the drainage material upon examination was found to contain many streptococci and other germs which we found were causing the distress and tenderness especially in the region of the duodenum. The first thing then of importance is to make a correct diagnosis, so that we will not be making holes in the stomach in some of these patients who do not have a stomach or duodenal ulcer; and then I am thoroughly convinced that the Sippy treatment carefully followed up will effect a cure. We sometimes make mistakes in prescribing for our patients and allowing them to go around about their business. We will never cure duodenal or stomach ulcer in that way. I believe it is just as necessary to put the patient to bed for a stomach or duodenal ulcer as it is for the treatment of a broken leg. I rarely consent to undertake the treatment of any of these ulcers without first having it understood with the patient that he must go to a hospital or to his home and remain there until I am ready to say that he may be discharged. I have been very much pleased not alone with my own treatment, but with the success of this method of treatment by my colleagues and other physicians.

DR. A. C. STRACHAUER, Minneapolis (closing): I want to thank Drs. Hunt, MacLaren and Andrews for their dis-

cussions. I do not believe that Dr. Andrews could have correctly understood what I said regarding acids and secretory analysis. Perhaps some of the rest of you did not, and with your permission I will re-read that one paragraph. (Reading from paper.)

"Of 100 cases of ulcer of the duodenum, ulcer of the stomach, and carcinoma of the stomach treated at the University Hospital the past year, 20 per cent of the carcinoma cases had free hydrochloric acid; of 28 ulcers of the duodenum the patients had hypoacidity and anacidity, and not all had hyperacidity."

The cure of the callous ulcer is just as difficult to accomplish as the cure of a leg ulcer. Also, following the conservative healing of these leg ulcers, we all have had experience with the case with which they break down again. I believe that some of the healed gastric ulcers also break down again in certain cases from a lowering of the local resistance of the healed-over area which does not enjoy the wonderful immunity to the irritation of the gastric contents.

I want to emphasize the importance of excision of ulcer. It is always a satisfaction to have the ulcer in a bottle rather than in the patient's stomach or duodenum.

As to the principle of prophylaxis regarding the possibility of malignant development in a gastric ulcer, malignant degeneration of gastric ulcer is a fact and not a theory. The resectibility of ulcers increases with the experience one has in resecting them. It is comparable in experience to myomectomy; the more you do, the more you are able to do.

The Finney operation does not alone overcome the obstruction, but in properly selected cases by proper and prolonged and adequate preoperative preparation it provides opportunity for the excision of the ulcer as a part of the same incision.

Regarding disability following a too wide excision of gastric ulcers, with a remaining distal portion of the pyloric end that does not properly function, pyloric resection removes the ulcer, removes the possibility of malignant degeneration and results in one of the most satisfactory functioning procedures that is practiced on the stomach.

DR. ANDREWS: In these cases of malignancy have you found hyperacidity of the stomach?

DR. STRACHAUER: Yes, we find hyperacidity in carcinoma of the stomach.

DR. ANDREWS: Do you find in the same patients that obstructive symptoms will cause hyperacidity?

DR. STRACHAUER: In a general way most of these carcinomata of the stomach were associated with obstruction, but not always. In some of the carcinomata with hyperacidity the stomach emptied over-rapidly. There was no obstruction whatever, but some of them did have obstruction with hyperacidity.

COMMON CONDITIONS SIMULATING PULMONARY TUBERCULOSIS*

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Duluth, Minn.

My reason for presenting this subject today is, that I believe a more serious effort should be put forth to differentiate between the tuberculous and the non-tuberculous, for manifest reasons. Tuberculosis is both over-diagnosed and under-diagnosed.

Fishberg¹ makes the following statement: "Fifty per cent of patients in one of our largest municipal sanitariums have negative sputum. That this is an indication that many are non-tuberculous will be agreed to by every one who has had any experience with tuberculosis. With the anti-formin method of sputum examination, at most ten per cent of active cases are found not expectorating bacilli." J. A. Miller² says: "In my service at Bellevue Hospital as high as twenty per cent of the cases admitted for treatment are not tuberculous." In December, 1915, after a little more than a year of war, Professor Landouzy announced that 86,000 men had been discharged from the French army on account of tuberculosis. Later, after a careful study, Major Rist³ announced that only one-fifth of these men had tuberculosis.

In this country during the war thousands of soldiers were sent to the various tuberculosis hospitals, who did not have the disease. And the fact that the diagnosis had once been made is today costing the federal government much money annually. Ash⁴ found 11.6 per cent non-tuberculous in 198 necropsies at the Boston Consumptive Hospital. At the Montefiore Home County Sanitarium, Stivelman,⁵ in a study of 1,700 consecutive cases, states that 176 were found to be non-tuberculous. He makes the following instructive and interesting statement: "At our sanitarium an unrivaled opportunity presented itself to check the diagnoses of general practitioners as well as specialists in tuberculosis, because it is only on the strength of a positive diagnosis, corroborated by at least one specialist, that patients are admitted."

Major Rist³ says that if such mistakes were exceptional it would be more or less excusable to think lightly of them. But they are far from being exceptional,—even in Germany, where, as you well know,

no man ever made a faulty diagnosis. Whether, as Meissen of Germany says, the fear of being regarded as a poor diagnostician leads to the making of the diagnosis of tuberculosis, on uncertain and slight indications; or whether, as Frankel states, too great value is placed on relatively insignificant findings; or whether the error is due to an incorrect interpretation of the findings, or simply a lack of careful and painstaking study of the case, I am not sure; but I believe in the majority of cases it is the latter.

There are many common conditions which simulate tuberculosis, both from the symptoms and physical signs, and a few will be considered under the following heads:

1. Those with few or no physical signs revealing themselves, but in which the history and symptoms are most suggestive.
2. Those with definite physical signs.
3. Influenza.
4. Gas (warfare).

I. THOSE WITH FEW PHYSICAL SIGNS

Focal Infections: I put focal infections first because I believe that the most common conditions mistaken for tuberculosis are the focal infections of the upper respiratory tract. We might as well examine the stomach *only* of a patient with gastrointestinal symptoms, as to examine the lungs *only* of a patient with disease of the respiratory tract.

Of 1,000 men diagnosed as tuberculous, Kindberg and Delherm⁶ found 193 only to be actually tuberculous, while 113 had chronic nose and throat conditions. A later report may show a larger number tuberculous, as it has been my experience in some of the ex-soldiers who had originally been diagnosed as tuberculous, then later as non-tuberculous.

These patients present themselves usually on account of a cough, general debility and loss of weight. The cause for the cough is often sought for solely in the lungs, yet the chronic nasal conditions—namely, chronic ethmoiditis, maxillary sinusitis, adenoids, deflected septum, hypertrophied turbinates, diseased tonsils—all may have one common symptom—coughing. Every cough must be accounted for.

These conditions are frequent in children, and the pediatricists have been the first to realize the relation. These cases, if recognized and treated by the nose and throat specialist, will readily be cured and the cough will subside.

*Presented before the Minnesota State Medical Association, Duluth, Minn., August, 1921.

While these nasal conditions constitute the largest group of focal infection, still the "suspect" must be thoroughly examined for any other possible foci of infection, such as teeth, gastro-intestinal tract, gall-bladder, appendix, pelvic organs and genito-urinary tract.

Hyperthyroidism: The cases of hyperthyroidism comprise another large and interesting group. There is a train of symptoms familiar to you all and common to both diseases. These symptoms are: malaise, fatigue, loss of weight, tachycardia, nervousness, cough, sweating and elevation of temperature. Many cases of hyperthyroidism have been diagnosed and treated for long periods of time for tuberculosis. Goetsch,⁷ believes that the adrenalin test is of much value. He states that over a period of three years the use of this test in hyperthyroidism, which was later confirmed by operation and microscopic study of the gland tissue removed, has convinced him of the reliability of the adrenalin hypersensitive test. He⁸ claims that many cases of hyperthyroidism have undergone rigid anti-tuberculosis therapy over many years to no avail. Also that there is a group of cases in which there is a demonstrable tuberculous lesion which does not improve under anti-tuberculous therapy but in which there is also present a definite hyperthyroidism. He has published some encouraging reports, and comes to the conclusion that in a considerable number of border-line cases presenting symptoms more or less characteristic both of tuberculosis and hyperthyroidism, he can now pick out those suffering with hyperthyroidism.

On the other hand, Boas⁹ comes to the following conclusion: "The epinephrin test is of no value in the differential diagnosis of doubtful cases of tuberculosis and hyperthyroidism. First, it is not a specific test for the latter condition, but betokens only a heightened sympathetic irritability. It may be positive in frank cases of tuberculosis. Second, symptoms of hyperthyroidism, including goiter and eye signs, occur in a certain number of cases of early tuberculosis, and may possibly represent a defense reaction of the organism to the infection."

Also Webb, Gilbert and Ryder¹⁰ have come to the following conclusion: "It seems more probable to us that this increase in the size and the function of the thyroid is a phase in the marshaling of the body's defensive forces against the invading disease."

Asthenia and Neurasthenia: It is not necessary

to describe the symptoms that these patients present. There are, according to Dercum,¹¹ two principal symptoms in neurasthenia,—nervous weakness and nervous irritability; and when examined carefully, these patients will be found to present motor, sensory, psychic and somatic symptoms.

A hidden tuberculosis may be the cause in both instances, and the nervous symptoms develop from toxins which develop in the focus of infection. In many children tubercle toxins injure the nervous system, destroying the nerve balance, and, through this, interfere with proper physical development. This harmful influence on the nervous system is often carried on for a prolonged period before frank clinical tuberculosis develops. It is often difficult to tell whether the nervous condition or the tuberculosis existed first.¹² Prolonged and careful observation is very necessary in this group of cases.

Anemia: The various anemias and leukemias frequently simulate tuberculosis. The languor, extreme debility, shortness of breath, irregular temperature and cardio-vascular symptoms make up the clinical picture. It must be borne in mind that tuberculosis often develops in primary anemia, and also that a secondary anemia, due to tuberculosis, may closely simulate chlorosis.¹³

Gastric Ulcer: Were it always easy to differentiate between hemoptysis and hematemesis, there would be little difficulty as a rule. Blood may be aspirated and coughed up; also it may be swallowed and vomited. Blood will appear in the stool in either case. An important point to remember is, that if the patient continues to expectorate blood-streaked sputum after the initial hemorrhage, the blood comes from the lungs.

The writer recently saw a case of carcinoma of the cecum that very beautifully simulated pulmonary tuberculosis.

Fevers (Typhoid and Malaria): When the usual clinical picture of these fevers is present, there is not much chance for error in diagnosis. A fever of pulmonary tuberculosis with obscure chest findings is more apt to be called typhoid. This is an unnecessary mistake.

Septic Endocarditis: This condition is frequently overlooked. There may be an indefinite febrile attack, with no positive heart sign, and not until the condition causes an embolism in the brain, spleen or kidney is the nature of the disease suspected. However, when the murmur is present,

also fever, leucocytosis, enlarged spleen, petechiæ, positive blood culture, the diagnosis is easy.

II. THOSE WITH DEFINITE PHYSICAL SIGNS

Chronic Non-Tuberculous Lung Infection: Under this heading a variety of pathological pneumonic processes have been described. Many of these cases are treated as tuberculosis, and they usually improve or recover.

The infecting organism seems to be the bacillus influenza, streptococcus, staphylococcus and pneumococcus. The cases in this group have been variously named as: subacute or chronic broncho-pneumonia, or peri-bronchitis; lobular form of broncho-pneumonia of long duration.

Miller¹³ says the pathology may consist of a localized bronchitis with a lobular distribution, which may clear up or persist in a subacute form, offering a site predisposed to exacerbations and increased tendency to fibrosis.

These case are extremely chronic, with frequent exacerbations. The physical signs may be insignificant, yet the lung infection be the cause of a long continued fever.

The symptoms vary. The chronic morning cough with expectoration and even hemoptysis makes the diagnosis confusing. The physical signs are usually in the lower lobe. A basal tuberculous lesion is rare, and the patient is always toxic. If the lesion is in the apex, the diagnosis may be extremely difficult, and will require observation.

Chronic Bronchitis and Emphysema: These patients usually give a history of cough with expectoration extending over a long time. The cough is worse in cold and changeable wheather. The sputum may be blood-streaked. The general health of the patients is fairly good, and they do not have the toxic symptoms of tuberculosis. The adventitious sounds are heard all over the lungs, more especially the bases. Resonance is not impaired at the apices. The x-ray does not show the mottling of tuberculosis. The sputum is negative, and it is rare to find a negative sputum in an extensive tuberculosis with profuse expectoration. The tuberculous complications are absent.

However, tuberculosis frequently develops in these cases. Also, some forms of chronic tuberculosis slowly develop an associated emphysema which may be accompanied by bronchitis and asthma. When seen, the underlying tuberculosis may be masked by the other condition and overlooked.

Bronchiectasis: The history of these cases usually dates from an attack of pneumonia, grippe or pleurisy, and may be of long standing. Large quantities of purulent sputum is expectorated periodically. Posture influences the attack. There may be hemorrhage. Some patients may pass many years in a comparatively good general condition, while others may lose weight, become dyspneic and tire easily. As in chronic bronchitis, these patients are apt to have severe attacks in cold and changeable weather.

"The difficulty in diagnosis is increased by the fact that tuberculosis may be accompanied by the expectoration of large quantities of sputum and not show bacilli. Cavities at times suppurate after the bacilli disappear. Also, cases may be free from bacilli for years and be considered as simple bronchitis, and then show bacilli."¹⁴

The areas are usually in the lower and middle lobes and unilateral. There are not the tuberculous complications which might be expected in such extensive involvement. Resonance is influenced by the amount of secretion. If it is located in the upper lobes, resonance is not impaired above the clavicles; in tuberculosis it is. Tuberculosis is contiguous from the apex.

The x-ray and sputum findings are most valuable.

Abscess: There is usually a history of cough beginning after an operation, or a septic pulmonary embolism or pneumonia. Those following pneumonia may be a type of empyema which ruptured spontaneously into a bronchus. Following the pneumonia there may be a slight rise of temperature daily, and empyema may be suspected and unsuccessful explanatory attempts made to localize it. Lung abscess usually occurs in the lower lobes, and there are present the hectic fever, sweating and septic symptoms.

Mitral Disease: There are symptoms common to both mitral disease and pulmonary tuberculosis, such as cough, expectoration, hemoptysis, emaciation and fever; and yet it is rare to find these two diseases co-existing in the same patient, so rare that Fishberg has made the following definite statement: "It has been my rule never to diagnose tuberculosis in one showing signs of disease of the mitral valve and cardiac hypertrophy or dilation, irrespective of physical signs, unless the sputum reveals tubercle bacilli."

Birch-Hirschfield found only three cases of tuber-

culosis in 4,359 autopsies. The frequency of hemoptysis in mitral stenosis is one reason for the difficulty. In a study of 3,456 cases of hemoptysis at the Massachusetts General Hospital by Cabot, 1,723 were found to be due to pulmonary tuberculosis, and 1,177 were due to mitral stenosis.

The murmur in mitral stenosis is variable, difficult at times to elicit and not always present. The cause of hemoptysis in fully compensating hearts is engorgement of the pulmonary circulation and rupture of the blood vessels. In cases of heart failure it is due to infraction or embolism, due to clotting in the auricular appendage during auricular fibrillation.¹⁴

The râles in heart disease are usually in both lungs and at the bases, with clear apices. But they are not always basal and may be found over other parts, even in one or both apices.¹⁵

III. INFLUENZA

Prior to the epidemic of influenza in 1918, patients with a history of cough, fever, loss of weight, etc., together with suggestive physical signs in the chest and also suggestive roentgenographic evidence and with persistently negative sputum, were diagnosed as pulmonary tuberculosis. Since the epidemic we have found that many of these cases are really post-influenzal conditions of the lungs. It must be remembered that influenzal inflammation of the lung may simulate tuberculosis very closely and that time, and time *alone*, will show that the influenzal pathological condition does not remain as does tuberculosis. Repeated examinations of the sputum are absolutely necessary. Sloan reports the questionnaire and summary of answers received from 29 sanitariums (June, 1920). In answer to the question, "In your experience, has the epidemic of influenza increased the number of cases of tuberculosis requiring sanitarium treatment in your section of the country?" twenty-three answered yes, two slightly, two no and two undecided. Of my own cases of tuberculosis I find that 26 per cent date their symptoms from an attack of influenza and were perfectly free according to the history from any known tuberculosis, prior to the epidemic. Influenza is an etiological factor in the reactivation of latent tuberculosis and does "mark the beginning of definite pulmonary tuberculosis."

IV. GAS (WARFARE)

Since the use of gas in the world war, we have encountered a hitherto unknown pathological condition, which demands careful study, namely, gas

poisoning and its effects. Tuberculosis does develop in some of the cases. In my records of 100 consecutive cases of gas poisoning, I have found 12 cases of tuberculosis. This fact must be borne in mind. However, while the symptoms in the chronic cases of gas poisoning are similar to those of tuberculosis, the findings are quite definite and differ from tuberculosis.

The symptoms in chronic cases in order of their frequency are as follows: shortness of breath (especially upon slight exertion and paroxysmal in character), weakness, and early fatigue; cough, with or without expectoration, may be paroxysmal, and occurs at various times during the day or night, or when in close places or upon inhaling dust; pain in various parts of the chest, nausea and vomiting, poor appetite, pain after meals, constipation or diarrhea, loss of weight, hoarseness, tachycardia (which may be paroxysmal), easily irritated eyes, tendency to catch cold easily, perspiration and pleurisy.

The physical examination of cases of gas poisoning will reveal the following: (1) inspection will show diminished expansion, rarely of the entire chest, most frequently of the bases (one or both, more often the right, less frequently the upper region); (2) tactile fremitus may be increased; the respiration is shallow; (3) there may be impaired resonance; percussion may be normal or even hyper-resonant, in some cases reminding one of the emphysema of asthma; (4) inspiration is rough, harsh, and sometimes of the cogwheel type, slightly intense and heard over the entire chest better than normally, providing there is no pleural thickening; in some, expiration is prolonged. Over the bronchial areas themselves the breathing is almost tubular in quality. The râles are scattered, but more prominent in the middle of the chest, not in the extreme apices or bases; they vary in size and usually clear up on coughing. They are not the true subcrepitant or indeterminate râle, and of course are never resonating. When the patient expires, coughs and inspires, the râles do not come at the beginning of inspiration as the tuberculosis râle does, but later on, and extend through inspiration. They resemble the sibilant and sonorous râle.

An x-ray examination of the lungs shows a very definite picture. There is considerable increase in the tissues around the hilus of the lung. The plates show evidence of disseminated inflammation; peribronchial infiltration extending well out into the lung substance, but not as a rule to the periphery.

An intense peribronchial infiltration extends to the bases. The apices are usually clear. There are often localized areas of fibrosis.

The writer has selected only the most frequent conditions which are commonly mistaken for tuberculosis, and in conclusion will say that with more careful and thorough study of our cases, and a conscientious utilization of the roentgen ray and of our laboratories, we will make fewer mistakes in the diagnosis of pulmonary tuberculosis.

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MAXILLARY SINUSITIS OF DENTAL ORIGIN*

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The nasal accessory sinuses have been the subject of much discussion for many years and now, after several centuries, we are still not agreed on many things concerning these sinuses. For instance, it is easy to find authority for the statement that seventy-five per cent of antrum infections are of dental origin and just as easy to get authority for stating that seventy-five per cent are of nasal origin.

It seems very doubtful whether an antrum infection can be set up by the direct invasion of the healthy mucous membrane by micro-organisms. In

health this mucous membrane is protected by its secretion, which is inhibitory toward bacterial growth, as well as by the action of its cilia. When this protection is lost (usually through some extrinsic causes) suppurative inflammation can be caused by direct invasion of the bacteria. [Skillern]

These extrinsic causes of lowered vitality are given by most text books on "Nose and Throat" as two: (1) general disease, usually an infectious one; (2) obstruction to the sinus ostium by swellings, either bacteriological or otherwise in origin. To these I would add (3) dental disease, which may be the primary cause even in the presence of one of the other two.

In the case of an infectious disease such as influenza, the direct connection between it and the local sinus disease has not been clear heretofore. Probably there is a devitalization of the mucous membrane in the sinus due to the influenza which makes it susceptible to infection. I believe some dental disease, such as an abscessed tooth just beneath the antrum, is the most likely source of this secondary infection. It may have acted as a mild irritant over some time and when the mucous membrane is lowered in resistance it sets up the infection. This seems more logical when we consider that the bacteria found in the sinus are usually not the ones causing the general infection. Further, the course of the sinus disease is, in this case, quite independent of the patient's primary disease.

In the presence of some obstruction to the antrum's ostium the mucous membrane of that cavity will change and become less resistant to bacteria. Here again dental disease can be the cause of the actual infection of the sinus. The dental condition may have been so mild that the mucous membrane could resist infection while it was healthy, but with lowered resistance, due to obstruction, it could no longer keep up the battle.

Dental disease, in the two above mentioned conditions, we have considered as being in a contributory rôle. When the dental condition has been present long enough, the infection will creep along the lymphatics of the bone, or the pus itself will come into actual contact with the antral mucosa. Soon this will cause the mucous membrane to become irritable and to be lowered in resistance until it yields to the progressive infection and an antral suppuration is set up. The mucous membrane becomes thickened and gives rise to an abundant purulent secretion which drains into the nose. This the patient interprets as a "cold." Many so-called

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cases of rhinitis are really a primary sinusitis with the nasal symptoms secondary. This type of antrum disease may be acute, subacute, chronic or recurrent.

The type of dental disease which may cause antral infection varies. It is not always the carious tooth, the manifest alveolar abscess, or the apical abscess seen in the x-ray; but areas improperly treated after extraction, retained roots, devitalized teeth with root canal fillings, or partially dead teeth (such as one root dead), may be responsible.

Very careful study of many x-ray films taken at all angles is necessary to discover certain pathological areas. Close co-operation with the dentist is imperative, for his knowledge of the finer anatomical and pathological details is of tremendous value.

Clinically, the antrum of tooth origin has many characteristics, chief of which is its tendency to recur. A recurring maxillary sinusitis is nearly always due to a dental disease. These recurrences are often considered by the patient to be "one cold after another." Sometimes they complain only of "bad catarrh," or of discharge dropping into the throat. Close questioning will perhaps reveal the fact that these colds are one-sided, or that a one-sided purulent nasal discharge persists after the "cold" got well. Sometimes the patient knows that these colds all started following some dentistry. In these days of the exodontist's activity, an unavoidable opening is frequently made into the antrum from the mouth, which often results in an infected antrum, as the antrum is a fertile field for the normal bacterial flora of the mouth.

There are other cases whose chief complaint is photophobia. In New York City Dr. David Webster has a series of such cases. The patient will put on colored glasses and get no relief. Sometimes he will be treated for retinitis and even for lues but gets no relief till the antrum is treated.

In about sixty per cent of our antrum cases, even those not associated with ethmoidal or sphenoidal disease, the blind spot shows enlargement.

The transillumination findings are of great value, especially in recurring antrum infections. By using a small transilluminator, under rheostat control, one antrum will be found to light up better than the other when the lamp is turned low, which difference would not show up with a brighter light. This finding can usually be checked up by the x-ray, which at the same time aids in ruling out such things as cysts or polypi of the antrum, unequal size of the two cavities, or unequal thickness of

their bony walls. This type of antrum is apt to show variation, one day much darker than another. Almost always one will find dental disease below this darker antrum. After careful use of suction or by irrigation, pus is seldom found at this stage, but a mistake is made to conclude the antrum is "negative" because no pus is obtained on irrigation. If the patient is instructed how to watch for any symptoms, especially keeping watch of the nasal discharge from each nostril—he is very apt to return with his own diagnosis of antrum infection made.

By watching the course of an antrum under treatment much information can be obtained, a fact that text books fail to mention. The characteristics of the secretion when irrigated from the antrum are quite definite. A milky or odorous discharge from an acute antrum nearly always means it is due to a dental cause. Pain, tenderness or swelling of the cheek suggests a tooth. Pain in a certain tooth during the irrigation of the antrum puts that tooth under suspicion. An acute antrum which does not get well promptly is usually due to dental disease. An antrum which has recurring attacks of suppuration is nearly always of dental origin. An antrum which is changeable under treatment, that is, nearly well one day and odorous and milky the next, means dental pathology.

After the diagnosis is made, the first step in treating an antrum of the dental type is to remove all dental disease. Without the co-operation of the dentist little can be done. We have repeatedly had dentists give a negative report on the tooth when we felt certain that there was some dental cause present. Realizing the difficulty of diagnosing these minute lesions we have insisted upon further investigation, which has shown some dental pathology, the removal of which has resulted in the cure of the antrum. Not infrequently we have to get the dentist to extract a tooth on OUR responsibility and when he sees the antrum get well he is convinced.

Some illustrative cases follow in brief:

Case No. 290. Miss H. complains of having had a cold for the past few days. She has seen pus coming from each nostril. Her dentist tells her all the devitalized teeth are out. Transillumination shows the right antrum one notch darker than the left. After instruction as to using the nasal suction pump and watching herself for a few days, she came back with her right antrum dark on transillumination and full of milky pus. One tooth was always painful at irrigation and for several hours following. The dentist found this to be a vital tooth, but the milky discharge continued for nearly a month. Finally the dentist removed the filling of this tooth and found one root contained a dead nerve. After extraction of this tooth the antrum promptly cleared up and there have been no recurrences of antrum trouble in the past three years. This is the first case in our

records of an antrum infection being caused by a tooth which was "vital" to tests, yet was partly dead. We now have about fifteen similar cases.

Case No. 1649. Mr. J. is treating for pulmonary tuberculosis. Has seen pus coming from the right nostril for over a year. There is a spot on the right cheek that is very tender, in fact his barber can hardly shave this spot. The right antrum transilluminates black. Irrigation shows milky odorous pus. There is a fistula over the area where the first upper bicuspid was extracted, which drains pus, but a probe will not enter the antrum. X-ray shows pathology here. This area was opened and necrotic bone removed; also a root was found which did not show up in the x-ray. In ten days the antrum was well.

Case No. 1212. Mr. N. for several months has had frequent left-sided colds. These last from two to four days and they are accompanied by pain and swelling of the left cheek. Yellow pus pours out of the left nostril during these attacks. Transillumination shows the left side to be slightly darker than the right. X-ray of the second upper bicuspid shows a large apical abscess. This tooth was extracted and followed by a gush of pus from the antrum. Since then he has had no trouble.

Case No. 828. Mr. B. Following la grippe six years ago there was foul yellow nasal discharge lasting eight months. This has recurred several times since. There have been numerous attacks of bronchitis. Transillumination shows the right antrum to be dark. X-ray shows the upper two bicuspids devitalized. Irrigation shows milky odorous pus. These teeth were extracted and no opening made into the antrum. In twenty-four hours the odor had gone and the pus from the antrum was blood tinged, showing a definite relation between the dental disease and the antrum disease. In one month the antrum was well and has been so ever since.

After seeing many cases clear up so promptly following the removal of the dental disease, it seems natural that if these teeth had been treated earlier the antrum infection could have been prevented. A patient with a suggestive history, transillumination findings typical, and dental disease beneath his antrum has enough to justify a diagnosis of recurring antrum infection. This diagnosis holds good even if there is no pus in the antrum at the time of examination and even if no antrum irrigation is made. The patient can save himself much trouble by having his teeth taken care of at once and not waiting for his antrum to become reinfected. This will be demonstrated when we see his antra transilluminate equally and his frequent colds and nasal discharge cease when his teeth are cared for.

Not every antrum will respond to irrigation after removal of dental cause. A chronic antrum is most resistant, but every antrum should be treated conservatively for as long a time as seems reasonable, probably a month at least. After the most painstaking search for dental pathology and its most

thorough removal, the antrum should be cleaned out daily and the character of the discharge studied. If its odor stops and it stops being milky and the water becomes clear, the progress is favorable. Should no change be noted over a reasonable time, further measures should be instituted.

Of course the ethmoids and frontals should be put in normal condition and nasal breathing space made ample by correcting any obstruction. Mere mention is made of this as this paper is concerned with a different type of antrum infection.

Should operation be necessary, the antrum is best attacked through the nose. It is to be hoped that the days of pulling sound teeth, boring up into the antrum and washing through this hole, are gone. That method was introduced over two hundred years ago and was very popular in spite of the fact that most cases so treated were failures. An opening made from the mouth into the antrum, whether through the alveolus or during a tooth extraction should be closed as soon as possible to avoid constant contamination, and the antrum treated through the nose.

The object of operation is to establish ventilation and drainage and to restore the function of the mucous membrane. This can be done simply and easily by making a large opening through the naso-antral wall beneath the inferior turbinate. A portion of the lower turbinate can be safely removed if necessary to allow this opening to be made large enough. After this is done the patient can be taught to keep his own antrum clean until it gets well.

The more radical operations of curetting the antrum and destroying the function of the mucous membrane, are very rarely indicated because a very chronically infected antral mucosa will recover if proper drainage and ventilation is established. A true polypoid condition of this membrane is very rare indeed. In the rare case of bone involvement, the radical operation may be necessary, but the bony walls of the antrum are usually not involved for there is a double blood supply to the floor and nasal wall, one from the antrum itself and one from the mouth and nose. In our office, during the past three years we have not had to perform such an operation a single time.

In conclusion I wish to thank my associate, Dr. E. H. Parker, for the privilege of expressing here many ideas which are originally his and of using much material he has gathered in the course of his large experience in treating maxillary sinusitis.

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HELIO THERAPY*

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When Rollier gave us his method of heliotherapy, he put into our hands an agent for the treatment of surgical tuberculosis which has proven without a doubt to be far superior to any other. Surgical tuberculosis is rarely recognized in its early manifestations, and the patient is fortunate indeed if he accidentally falls into the hands of someone who makes the correct diagnosis.

In the classification of surgical tuberculosis, we may tentatively include all forms of tuberculosis excepting pulmonary, and as we give heliotherapy only to selected cases of pulmonary tuberculosis, depending on the different conditions which manifest themselves, we will deal with only those cases we think suitable for solarization.

All of Rollier's predecessors in sun-therapy were content to make exacting researches and advance science with their findings, paying little, if any, attention to the practical application of their methods. It was left to Rollier, who was sufficiently trained surgically, to put his method of heliotherapy on a firm practical basis and bring his treatment before the medical world. This treatment today is as far ahead of the expectant treatment of plaster casts and splints, as the rest treatment of pulmonary tuberculosis is ahead of the older ideas where fresh air and good food played the important part.

Sunlight is composed of waves of different lengths which, when passed through a prism, are broken up into the colors of the rainbow—red, orange, yellow, green, blue and violet. These rays are known as the visible spectrum and together make up white light. Beyond the red rays are the invisible infra-reds, and beyond the violet rays are the invisible ultra-violet rays. These rays are subdivided into classes, as calorific or heat rays, and to this class belong the infra-red, red and orange rays; the luminous rays, as the yellow and green; the actinic or chemical rays, the violet, blue and ultra-violet rays. The different rays have different penetrating powers and are more effective in high altitudes than in low because of the lessened

density and the increased purity of the air. Light may be either reflected or projected; different conditions, such as the presence of dust, smoke and gases, may arise which will hinder their penetration. Particularly is this true of the ultra-violet, upon which the curative action depends.

The action of light upon the skin is varied. There is little immediate reaction upon the skin while it is exposed to light. Later, usually from six to twenty-four hours after an exposure, the patients feel the sensation of itching, smarting and pain; then the redness appears and all the sensations of a burn manifest themselves. Likewise, the reaction of the skin to the sunlight depends upon the intensity and the duration. At first the skin responds and endeavors to protect itself from a foreign irritation, this irritation being the ultra-violet ray. For it is due to this ray that sunburn is produced, and not to the red rays as is commonly supposed. Naturally the skin's response to this irritation is the formation of a pigment, by producing at first a dilation of the superficial capillaries and blood vessels with a resultant erythema. Following the erythema, a pigment is produced in the skin. This pigment deposit becomes greater in intensity and the skin takes on a bronze hue, then a copper color, and finally a chocolate brown.

The sun conveys a feeling of warmth throughout the body, warms the blood passing through the heated fields, and produces a dilation of the superficial capillaries and blood vessels. It stimulates the lymph streams, produces a general perspiration, increases general metabolism and stimulates the sudoriferous and sebaceous glands. There is a general increase in red cells of the blood and a decrease in leucocytes. The dilation of the vessels becomes permanent and the different layers of the skin thickened.

The skin, which at first is pale, anemic, and moist, takes on a nice, firm texture; it becomes dry and velvety to the touch and appears healthy. All this action is due to the calorific or heat rays. These rays produce tanning, which is the protective coat against the ultra-violet rays, so that the deeper the tan, the more protection afforded; and the deeper the penetration, the greater benefit obtained.

Certain precautions must be observed in the carrying out of the treatment, as heliotherapy, when improperly applied, may be dangerous and very injurious. It means a great deal more than turning a patient out into the sun indiscriminately.

Heliotherapy may be used for other conditions

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besides tuberculosis, such as puerperal sepsis, secondary anemias, dermatitis, cellulitis, rickets and selected cases of pulmonary tuberculosis. There are certain difficulties and dangers which manifest themselves, and the treatment, although simple, may become very dangerous in inexperienced and careless hands.

Surgical tuberculosis has always been looked upon as a local condition, and the aim of surgeons and orthopedists have been to cure up a local condition, little attention being paid to the general bodily condition, while in fact it is a general condition with local manifestations. Therefore, the general condition must be taken into consideration before attempting any surgery.

In the first place, it is well to ascertain the location of the focus of infection. A great percentage of cases never had a physical examination made of their chests. If this had been done, advanced pulmonary tuberculosis would have been found in a great many cases to have been the primary lesion, and no operation would have been attempted. A great many patients with positive sputum and active pulmonary tuberculosis have been subjected to the ordeal of an operation with anesthesia.

Rollier has an operating room in his clinic, but uses it as a court of last resort, preferring to cure cases without resorting to operation. He refers to plaster casts and splints as both an orthopedic and a physiological nonsense, as they deprive the body of both air and sun, particularly those regions of the body most in need of them. The sooner we realize that this form of tuberculosis must be treated as a general disease where resistance plays an important part, the sooner are we going to obtain results from these almost hopeless cases.

In giving sun cure at Glen Lake, we have followed Rollier's technique as closely as conditions will permit, and I will briefly describe our method of treatment.

Before starting a patient with the treatment, he is at first put into isolation, to determine whether he is free from a contagious disease. During this time, the blood, sputum and urinary findings are closely observed, and his temperature, pulse and respiration are carefully noted. This takes about one week, and in the meanwhile the patient has had an opportunity to become acclimated. By this time he is accustomed to the action of the light and air, having spent practically the entire time in the open.

Febrile cases must be watched very closely and

in these cases the time of exposure must be gauged according to the way the patient reacts to the treatment. The treatment is carried out in bed, on a couch, on a bench constructed for the purpose, or even on the floor.

No sun is given later than one-half hour before a meal, and not sooner than an hour after a meal. During the hot summer months it is well not to give the sun during the heat of the middle of the day, as it is very depressing and devitalizing and causes nausea, headache and temperature.

If a wind is blowing, every precaution must be taken to guard against a breeze striking the patient. A movable screen about five feet high can be placed in such a position as to warrant protection. This is absolutely necessary in the fall, winter and early spring. Although the patients are able to endure a great deal of cold, the slightest breeze will cool the body and will produce a chill which is liable to be the exciting factor in producing pneumonia.

The head is protected from the direct rays of the sun by means of a linen cap, sunbonnet, or awning at the head of the bed.

The eyes are protected by means of colored glasses. This is to ward off the intense sunlight, which will produce symptoms of eye strain, and also cause a muscal volitantes after the patient is taken out of the sun.

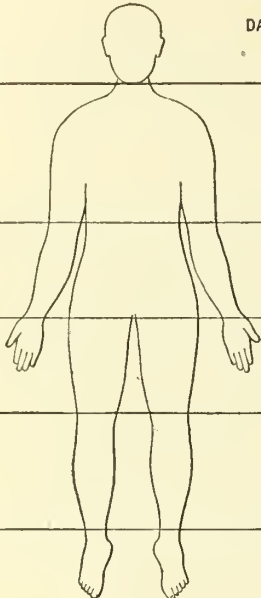
The muscal volitantes at first is very slight and transitory, but later becomes more or less uncomfortable. This condition, although transitory, is accompanied by headache, dizziness and derangements of digestion. This can easily be avoided by colored glasses.

The following schedule is followed by us in giving sun-cure:

The body is divided into zones, as feet, legs, thighs, abdomen, chest and neck.

First Day: The patients are clothed in either their pajamas or nightgowns. Their head and eyes are protected from the sun by means of a sun shade or glasses. The feet are exposed first without regard to the site of the lesion. The lesions are kept covered with a gauze or wire screen until the whole body has been gradually exposed. The feet are exposed as far as the ankles and insolated for five minutes. This is done anteriorly and posteriorly. There are four insolations given at not less than hour intervals.

Second Day: The feet are insolated for five minutes. At the end of five minutes the legs are

DR. ROLLIERS SCHEMATIC DIAGRAM OF INSOLATION													
		DAYS	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	From the 10th to the 15th day, increase according to the same scale. From the 15th day, all the previously exposed portions of the body should receive the same amount of insolation as the longest exposed part,—increasing the time 5 minutes daily, till a bath of from 3 to 4 hours is taken.
							5 Min.	10 Min.	15 Min.	20 Min.	25 Min.	30 Min.	
						5 Min.	10 Min.	15 Min.	20 Min.	25 Min.	30 Min.	35 Min.	
				5 Min.	10 Min.	15 Min.	20 Min.	25 Min.	30 Min.	35 Min.	40 Min.		
			5 Min.	10 Min.	15 Min.	20 Min.	25 Min.	30 Min.	35 Min.	40 Min.	45 Min.		
			5 Min.	10 Min.	15 Min.	20 Min.	25 Min.	30 Min.	35 Min.	40 Min.	45 Min.	50 Min.	

THE PROGRESSION BY WHICH THE PATIENT IS EXPOSED TO THE SUN

insolated for five minutes as far as the knees, thereby giving the feet ten minutes of insolation and the legs five minutes. This is done anteriorly and posteriorly four times, at hour intervals.

Third Day: The feet are insolated for five minutes. At the end of five minutes the legs are insolated as far as the knees. At the end of ten minutes the thighs are insolated as far as the hips, thereby giving the feet fifteen minutes, the legs ten minutes and the thighs five minutes. This is done anteriorly and posteriorly, once in the morning and once in the afternoon.

Fourth Day: The exposure is extended another five minutes up to the next zone, also the abdomen as far as the chest is insolated. This gives the feet twenty minutes, legs fifteen minutes, thighs ten minutes, abdomen five minutes of sun, and of course the posterior part of the body is also insolated.

Fifth Day: The next zone, or the chest, is insolated the same way, increasing five minutes each day. The insulations are increased five minutes each day until the patient is able to take three hours of sun daily: one and one-half hours in the forenoon and one and one-half hours in afternoon. We never give more than a two-hour exposure at one time. While the entire body is being insolated a loin cloth is the only garment the patient wears.

Occasionally, on account of severe pains or flexions of a limb, or other conditions, it is impossible

to roll the patient over and give sun on the back. It is well just to give solar radiations on the anterior part of the body and then, just as soon as the condition permits, give solar radiations on the posterior part. This can be done in about ten days or two weeks.

Sinuses or ulcers are not exposed until after the whole body has been insolated and then are given additional radiation by means of the Thézac Porsmeur lens, a description of which will be given later.

Precaution must be exercised, while the patient is becoming accustomed to the sun, and during the formation of the hyperemia, that no burn or any reaction occurs, for it is at this stage that the greatest damage can be done. If, for any reason such as burn, high temperature, acceleration of pulse, nausea, emesis, headache, or any other constitutional disturbances, it is necessary to discontinue the sun bath for a few days, the insulations must be started again a few steps back from where they were discontinued.

Blondes or red-haired individuals, where the blood vessels are superficial and where the pigment deposit in the skin is scant, are inclined to burn instead of tan. These cases are put on a diet of carrots and spinach to produce a carotenemia and a deposit of pigment in the skin. This enables blondes to develop a deep pigmentation, the degree

of which is an index to the progress the patient is making. The deeper the tan, the more favorable the case, and the sooner the recovery.

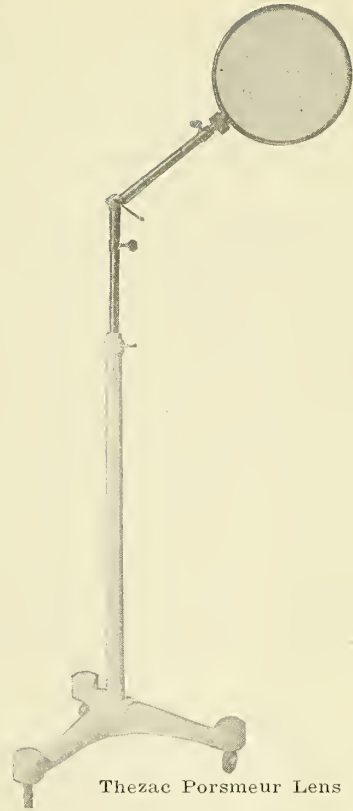
Patients, upon entering the hospital, are often thin, emaciated, cadaverous-looking, fever-ridden, anemic and almost dead with pain. They are afraid to have one lean against the bed, the slightest jar causing excruciating pain. These cases begin to improve in about ten days. The pain is relieved, chills and fever subside, and from an unhappy, sickly individual, we obtain a smiling, happy, contented patient.

Temperature is not a contra-indication to sun cure. As I stated, sun cure may prove dangerous if used indiscriminately. It has practically the same effect as tuberculin and produces the symptoms of such, and the tuberculin-like reaction may be of indefinite severity and duration.

Proper treatment increases the appetite, induces restful sleep and the return of strength, stops chills and night sweats, and increases the general metabolism. It acts as an alterative and reconstructant. It raises the temperature of the body, reduces blood pressure and relieves pain.

For deep-seated lesions, indolent ulcers, sinuses, localized pain, and sluggish wounds, we are using the Thézac Porsmeur lens. It was first introduced into this country by Mrs. Edward C. Post of New Port, and used in her sanatorium at Porsmeur Morlaix, Brittany, in the treatment of sluggish wounds among the soldiers. It is a biconvex lens with a diameter of 12 inches and a focal point of 72 inches. The lens is focused over the site of the lesion so as to obtain a circle of light seven inches in diameter. Less than seven inches, the heat from the circle is too hot to be comfortably borne by the patient, and greater than eight inches it is not efficacious. If the sun is very hot, the circle is made larger, and if the sun is poor, a smaller circle of light is used. The treatment is started at five minutes and increased five minutes each day until thirty minutes are being given, and then a treatment of thirty minutes is given morning and afternoon. Sluggish wounds which would not heal begin to take on a healthy aspect and granulation forms. Ulcers, sinuses and fistulas heal over and pain is relieved almost miraculously.

Great care must be exercised in handling the lens. At its focal point it burns anything combustible almost immediately. Special attention must be exercised in keeping colored materials away from the zone of light while a patient is taking



Thezac Porsmeur Lens

the lens treatment. White is the least combustible of all colors. It allows all of the sun rays to pass through it and offers the least resistance to the rays, thereby absorbing little heat. Under the direct rays of the sun, at the lens focal point, white cloth will burn in ten seconds, whereas colored cloth will burn instantaneously.

Indoors, where the sun enters through a pane of glass or through screening, colored material burns just as quickly as outside, while white cloth will not burn at all, proving thereby that sunbaths are not as efficacious when taken through glass or wire screening. On cloudy days, when we are unable to give sun cure, we give a general air bath. This acts as a general tonic and stimulant. We also use the Mercury Quartz Vapor Lamp. This lamp has been used as a substitute for the sun on cloudy days, and in winter, for so long a time that it now is an accepted adjunct to the treatment.

The following technique has been used by us in lamp treatment: Instead of zoning the body and increasing by five-minute periods, we give general body radiations for one minute, increasing one minute each day until fifteen minutes are given. We then increase by five minutes instead of one minute until thirty minutes are taken. The lamp is thirty inches from the body. By using precau-

tion in this, burns can be prevented. Later, after a patient has become well tanned, we can proceed more boldly and shorten the distance of the lamp from the body by successive steps to fifteen inches. When it is necessary to substitute the lamp for the sun during the course of the treatment, one minute of lamp is given for every five minutes of sun. The distance of the lamp depends upon the tanning of the body. The lamp treatment is just as injurious to the eyes as sun treatment and the same precautions must be used in both.

A physician is seldom consulted during the early stages of tuberculosis. It is only when definite symptoms manifest themselves that advice is sought, and then usually only after the rounds of "advertising specialists" have been made.

Pain is an almost constant symptom. It is usually dull, boring and continuous in character, and in children and adolescence often referred. It is rarely necessary to resort to opiates for the relief of pain, as sun cure accomplishes this in about ten days.

When it is necessary to remove the pus in abscess cases, it should be done by means of aspirations alone, never operating directly into the abscess, but a short distance from it, passing the needle first through healthy tissue, then into the abscess cavity. Sealing the cavity when withdrawing the needle prevents the possibility of the abscess rupturing and a mixed infection resulting.

Sun cure and air are foods. Both sun and air are bracing, invigorating and stimulating. Rest is an important factor. The part that is affected must be put to rest in favorable position. This is secured by putting the patient in bed. An affected joint should be placed in the most favorable position consistent with the comfort of the patient, at the same time taking care to overcome deformity and muscular contraction. Take, for instance, a case of tuberculous hip; the affected limb is raised from the bed and placed on a board at such a height that the spine lies on the bed in its normal contour. Weight extension is applied by means of circular leather cuffs, three inches wide, gripping the thigh fast above the knee and the leg just above the ankle; a pad of cotton and gauze is placed between the cuff and limb to protect the skin; straps on each side of the leg join the knee and ankle cuffs. Enough weight is applied to relieve muscle spasm. As the muscle spasm is relieved the limb is lowered by successive steps, so as to bring it flat on the bed, at the same time

maintaining the normal arch of the spine. The weight extension is applied to the long axis of the body. Care must be exercised that this is not improperly applied, because, if so, interosseous pressure may be increased and pain and deformity result. In lowering the limb, place the hand under the lumbar spines, and when you feel them just leaving the hand, that is the proper position to maintain.

Shoulder, elbow and wrist cases are treated in the same manner.

The amount of weight applied varies with each case. A safe rule to go by is to add one-half pound to each year of the person's age up to twenty years. After twenty years, usually ten pounds of weight is sufficient.

In a case of knee, the same idea is carried out, except that the pull is from the knee instead of from the hip. The leg is put at an angle of about 90° with the thigh, and supported by a board. As pain is relieved and muscle spasm is overcome, the leg is gradually straightened out.

In spine cases where there is a kyphosis, the patient is at first taught to lie upon his abdomen and support his body by means of his forearms locked underneath his chest. After the forearms become accustomed to carrying the weight of the body, a large triangular pillow, 18x20, is placed underneath the chest. The small end of the pillow is in a line with the center of the kyphosis. This produces a compensatory lordosis and allows the anterior bodies of the vertebrae to separate and produces a widening of the intervertebral disc. By widening the intervertebral discs the bodies are freed from each other and pain is relieved. It also allows, by producing a compensatory lordosis, the bodies of the vertebrae to assume a normal contour and overcome the deformity. In a great many cases, on account of the number of vertebrae involved and the extent of the deformity, several pillows must be used. The patient remains in this position the entire twenty-four hours and he is allowed to lie on his back only when it becomes necessary.

After the patient has been resting on his elbows for twenty-four hours a day for some time, he is turned on his back to see whether the kyphosis can support the weight of the body without pain. If this causes pain, he is again turned on his abdomen and the treatment is continued as before for a while longer. As soon as he is able to lie on his back for twenty-four hours, the kyphosis

resting on a mattress, supported by a board frame, without pain, a sawdust pillow, 10x15x4 inches thick is placed underneath the kyphosis. This continues the attempt of correction of the kyphosis by increasing the production of the lordosis. This is allowed to remain until it can be comfortably borne by the patient, and then a board of the same dimensions is used in its place. This remains in place until the patient is allowed up, *i. e.*, until the patient is apparently arrested—in all, usually about three years.

In those cases where there are pressure symptoms, weight extension is applied.

It is very important to know when tuberculous disease has been arrested in a joint case. When pain and muscular spasms have been overcome and swelling has subsided, the traction may be removed. If the disease is still active, muscular spasm will return.

Classification of Results: The results obtained in surgical tuberculosis have been temporarily classified at the J. N. Adam Memorial Hospital at Perrysburg, New York, as Arrested, Improved and Apparently Recovered.

As it is the aim of the National Tuberculosis Association to standardize terms and nomenclature in order to simplify things, I would suggest that the same terms used in the classification of pulmonary cases be used in surgical cases, modified in such a manner as would be fitting in the cases under consideration, such as the following:

Apparently Cured: All constitutional symptoms with all sinuses closed and physical signs to be those of a healed lesion for a period of two years under ordinary conditions of life.

Arrested Case: All constitutional symptoms with all sinuses closed and physical signs to be those of a healed lesion for a period of six months.

Apparently Arrested: All constitutional symptoms with all sinuses closed and physical signs to be those of a healed lesion for a period of three months.

Quiescent: Absence of all constitutional symptoms. Sinuses may or may not be discharging, the physical signs showing the disease to be stationary or retrogressive, the foregoing condition to have existed for at least two months.

Improved: Constitutional symptoms lessened or entirely absent. Physical signs improved or unchanged, sinuses usually discharging.

Unimproved: All essential symptoms and signs unabated or increased.

COMPLICATIONS FOLLOWING SURGERY OF THE GALL BLADDER AND BILE DUCTS

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During the last decade, owing to the better understanding of the pathology and the more refined technique in surgery of the upper abdomen, one would expect to find fewer complications following surgery of this region. This undoubtedly holds true to a large extent, and, in reviewing the literature, one is struck by the absence of reports on complications following operations on the gall bladder and ducts; nevertheless, they must occur more often than one is led to believe. Lack of knowledge of the normal anatomy, failure to recognize the anomalies of the blood vessels and ducts, hurried or incomplete operation together with poor exposure, may account for the greater portion of surgical accidents.

I shall only attempt to discuss the immediate complications attending surgery of the biliary system and not consider those others, such as acute dilatation of the stomach, general peritonitis, embolism and wound hernia, as these may also follow other abdominal procedures.

One of the immediate complications is hemorrhage, more marked in the cases of severe jaundice where there is a slow coagulation time and a tendency for all surfaces to ooze. Where jaundice is present preceding operation, the liability of hemorrhage should be foreseen and, if possible, steps taken to decrease the clotting time.

Dr. W. J. Mayo in 1911 said, "Hemorrhage sometimes occurs during the period of jaundice—oozing of blood at first from the wound, and, later, general bleeding of the purpuric type. Various remedies have been advised as preparatory treatment of this condition, such as chloride of calcium, thyroid extract, and numerous other agents. We have tried them faithfully but have not been able to see any benefits from their use. After hemorrhage has begun, the subcutaneous use of alien or human blood serum has been strongly recommended, but it has not the specific effect that, for example, it has in the hemorrhage of the newborn; and in a few cases in which we have used it, the benefits derived were doubtful. Transfusions help to lower the clotting time, but even these fail in the severe cases to stop the bleeding."

Nothing new was added until Bell and Walters

of the Mayo Clinic recently concluded that transfusion should be used only in cases of marked anemia and is a dangerous procedure in the very septic and jaundiced because of the effect of the "protein reaction" upon the kidneys. They further state that 50 per cent of patients with pre-operative jaundice who died following operation, died as a result of intra-abdominal hemorrhage. It seemed that death from hemorrhage is dependent on a coagulation time of more than ten minutes, and a marked degree of jaundice. They were able to reduce the coagulation time in several cases by daily intravenous injections of calcium lactate (5 c.c. of 10 per cent solution in redistilled water) and at the same time giving calcium by mouth and glucose proctoclysis. They attempt to reduce the amount of circulating bile pigment by a large fluid intake and excessive elimination.

Bleeding from the raw surface of the liver in cases of cholecystectomy is usually not serious and is readily controlled by stitching over the raw area or, if necessary, placing fat or, better, transplanting a piece of rectus muscle in the gall bladder bed and holding it in place by one or two sutures. Packing with gauze is to be avoided unless other methods fail, except in cases of acute empyema where cholecystectomy leaves a large raw bleeding surface. Here one should not use sutures owing to the possibility of carrying infection into the liver, causing liver abscess and pyemia.

The cystic artery passes behind and not along the side of the cystic duct, and is shorter and closer to the liver. It occasionally happens that artery is cut before it is grasped or that it slips from the forceps. Also, one must bear in mind the possibility of an anomalous artery which may be severed before it is clamped. In any case, bleeding is very marked and great care must be exercised in grasping the artery so as not to injure the ducts. Mayo says that the artery "retracts into a pocket in Calot's triangle, and the forefinger, properly placed, will check the bleeding at once. A few mouse-toothed forceps can be caught in the tissues about the forefinger, forming a little basket, and by lifting on the forceps the finger can be removed and the artery caught with exactitude." Judd's method of exposing and catching the cystic duct and artery, separating them from the liver, usually obviates the danger of injury to the common or hepatic ducts and allows one to easily tie the artery.

Bleeding from the cystic artery after the patient has returned to bed is most dangerous and the

symptoms of internal hemorrhage are soon manifest which, unless recognized and controlled at once, will surely lead to a fatal termination. The blood usually will not drain along the established tract and appear on the dressing, but will be retained, masking, to a certain extent, the diagnosis.

Injuries to the portal vein are rare, but have occurred, and require immediate attention and very delicate technique for their repair. Its lumen must be kept open.

Fistulae following operations upon either the gall bladder or ducts are either mucous, biliary or mixed in type. Balfour and Ross state that "because of the margin of error always present in surgery of the gall bladder and ducts, the numerous and varied factors which contribute to an inadequate original operation and the unknown incidence of stone reformation, it is doubtful whether total elimination of post-operative fistulae can be attained." Mucous fistula is seen only after cholecystostomy and is due to a failure to remove the stone which was impacted in the cystic duct. Occasionally, it may result from the scar contraction following ulceration due to prolonged lodgment of a stone in the duct. Removal of the cause results in quick closure of the fistula.

Biliary fistula may follow most any type of operation, but is usually due to a failure to remove all stones either in the common duct or gall bladder, or to injury to the ducts; it may open and close intermittently. Too low a division of the cystic duct in doing a cholecystectomy may rarely be a factor; chronic pancreatitis, which produces pressure on the common duct, may be a cause at times, but a fistula due to the latter will close, as the drainage will cure the pancreatitis. Cancer of the common duct will also cause persistent biliary fistula. These patients with a permanent bile discharge are very apt to lose their appetite and in time become quite emaciated unless a substitute for the bile is administered.

In the mixed type, pancreatic juice is discharged with the bile, and digestion of the skin and wound edges is likely to occur in spite of the precautions taken to protect these surfaces. Obstruction in the ampulla below the opening of the duct of Wirsung is necessary for the establishment of this type.

Fistulae from the gastro-intestinal tract are sometimes met in cases where the gall bladder was ulcerating into the stomach or bowel and after removal of the former the necrotic wall of the viscus gave way with a fistula resulting a day or two after

operation. The most serious is the duodenal fistula, which discharge causes digestion of the tissues. In the past these have often proved fatal, but of late good results have been reported from the use of x-ray, which has caused more rapid healing of the fistula. Beck's paste, thickened with one to two-thirds paraffin, injected three or four times daily, is said to be of value.

Perhaps the most annoying of complications—and the ones that will cause the prolonged suffering of the patient—are injuries to the common and hepatic ducts. These accidents are usually due to poor exposure and a failure to properly identify the various structures in that region before clamping or cutting them. They are usually not recognized at the time of operation but only after pain, jaundice or biliary fistula have appeared. Pain is a prominent symptom where the common duct has been ligated, and is felt along the costal margin, under the scapula and in the right shoulder. This is noticed before the jaundice has appeared and, like jaundice, disappears when the fistula is formed. Lesser injuries may result from a pinching or kinking of the duct, leading to the formation of scar tissue and stricture. Operations for repair of the common duct are very difficult even in the hands of the most expert technicians and serious because the patients are usually in poor condition when they consent to secondary operations. Numerous efforts have been made to graft fascia, inverted veins, and other tissue; but all have proven unsatisfactory, on account of their inability to withstand the irritating effect of bile, and the late cicatricial contraction and obliteration of the lumen. According to Horsley, only tissues should be used that have a biologic resistance to the normal contents of the duct or viscera to be repaired. The "T" tube has been used with success in selected cases, and Sullivan's principle of burying a rubber tube in both ends of the ducts or into the duodenum and surrounding it with neighboring tissues is one of the best methods to date.

The diagnosis of stricture of the duct offers a difficult problem at times; there may be a persistent or intermittent fistula. Jaundice of varying degree is present if the fistula tends to obliterate. Pain under the ribs and right shoulder when the fistula closes indicate back pressure, and is always relieved by the re-establishment of the drainage. Where the stricture is slight and no fistula is present, the other symptoms are also only moderate and may render the diagnosis exceedingly difficult;

stone in the common duct and malignancy will have to be ruled out. If opportunity for observation of the patient for a short period can be obtained, the differential diagnosis can usually be made.

Biliary peritonitis is due to the escape of bile into the general peritoneal cavity. It is seen very occasionally where the ligature has slipped off from the cystic duct either before or after the drain has been removed, and the bile not following along the drainage tract is retained in the peritoneal cavity. It is more apt to occur where there is a low lying liver that seals the incision, preventing escape of the drainage. It is this occasional complication that sometime may happen when the abdomen is closed without drainage in cases of cholecystectomy. Too short a division of the cystic duct—not allowing sufficient room for a good ligature—allows a little pressure to force the ligature off and let the bile escape. If the bile is sterile there is very little reaction at first and quite a large amount may collect before a diagnosis is made. These cases usually have nausea, vomiting, and distention with dullness in the flanks as the amount of bile increases. Icterus appears from the absorption of the bile pigments but is not intense (rather a yellowish tinge), and the urine will give the characteristic test for bile. If not diagnosed, these cases may go for some time before they prove fatal. A recent case seen in consultation had a cholecystectomy a month previous and the patient had become quite emaciated and had a tremendous distention of the abdomen. An incision evacuated over 8,000 c.c. of bile. The temperature in this case had been almost normal up to about three days before I saw her, at which time it rose about a degree and a half. If, however, the bile is infected at the time it leaks into the peritoneal cavity, we at once have the picture of the septic peritonitis plus the signs of absorption of bile.

Subdiaphragmatic abscess is a rare complication. Judd, in 1915, reported only seven cases associated with gall bladder operations. It is always a most serious condition and is accompanied by a high mortality, even though it is recognized and drained. It is more apt to follow operations where there is considerable pus with insufficient drainage established, allowing direct infection or soiling. It should be watched for in every septic case, because only early diagnosis and evacuation will allow the patient a chance for recovery. The portable x-ray should prove of value in diagnosing such a case.

Lockwood recently described the operative technique using the paravertebral anesthesia, which allows more extensive operations to be performed with much less risk.

Some adhesions in the region of the gall bladder and ducts are practically universal, but usually cause no difficulty unless the pyloric end of the stomach or the small bowel, especially the duodenum, becomes adherent, causing partial and very rarely a complete obstruction. This can easily be avoided, as Dr. C. H. Mayo says, "by forming your own adhesions," which is done by bringing up the great omentum and placing it in between the liver and the other structures, according to the method of Wyllis Andrews, thus walling off the dangerous raw surface. Wounds, tender a long time after healing, may be due to adhesions at the point of drainage, and may be greatly relieved by the use of hot applications and massage. Adhesions are also said to occasionally cause kinking of the ducts with resulting colic; this condition, however, must be extremely rare.

The older method of stitching the gall bladder to the abdominal wall in case of drainage is now obsolete; but these patients are occasionally seen with symptoms of pain and tenderness and pulling or dragging sensation, which is remedied by secondary operation.

Keen says that "post-operative neurosis should be sharply differentiated from mechanical interference from adhesions." Patients in this group complain of painful dragging in the region of the scar and other unrelieved symptoms. These cases are not benefited by reoperation and are sometimes seen having several scars. They are a most unsatisfactory type of case to handle, but some are benefited by an abdominal support, where the x-ray shows marked ptosis.

A review of our cases done since January, 1916, for diseases of the gall bladder and ducts, prompted this paper. In this series there were no cases of serious hemorrhage; two had biliary fistula, one due to stricture and the other to an overlooked stone in the common duct; one had biliary peritonitis coming on after removal of the drain at the end of a week. One case of subphrenic abscess following acute empyema of the gall bladder, also complicated by pneumonia, in spite of the multiple complications, made a complete recovery except for a wound hernia.

CONCLUSIONS

1. A knowledge of the normal anatomy of the

hepatic system is absolutely necessary before attempting surgery of that region.

2. A thorough understanding of the possible pathology and the various surgical procedures and their consequences is essential.

3. Poor exposure and "working in the dark," so to speak, begets a higher percentage of complications and poorer results.

4. Early recognition of the complications and immediate action shortens the period of convalescence, and lowers mortality.

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DISCUSSION ON THE PAPER OF DR. W. C. CARROLL

DR. W. E. SISTRUNK, Rochester: Doctor Carroll has prepared for us a very interesting paper and has considered

almost every complication that may follow operations on the gall-bladder and ducts.

His suggestions as to the pre-operative care of badly jaundiced patients are very good. We operate on no patients with greater reluctance than those who are badly jaundiced, and the mortality is as high in that group as in any patients that come to us for operation. I believe the most common complications which follow cholecystectomy are probably secondary hemorrhage from the cystic artery or injury to the common duct, and I will confine my remarks entirely to those two complications.

Some years ago Doctor Judd suggested a method of performing a cholecystectomy which we have found extremely useful and I believe it has been almost universally accepted in the Mayo Clinic.

(The operation demonstrated with slides.)

We have to think always of the common duct in doing a cholecystectomy. I think injuries to the common duct often occur through an effort to get beyond a stone which is lodged in the cystic duct or through efforts to control hemorrhage which has occurred from the cystic artery.

(Means of trying to avoid such accidents demonstrated with slides.)

DR. GEORGE G. EITEL, Minneapolis: The essayist has thoroughly covered all the important points regarding the complications that are liable to follow operations of the gall-bladder and bile ducts and, therefore, there is nothing for me to add, except to approve of what was said.

In going over this subject, I am, however, reminded of my early experience in surgery in this part of the anatomy with a case which I would like to briefly relate: A man, aged 58, gave a history of having suffered many attacks of gall-stone colic usually followed by jaundice. His last attack was the severest and he became very yellow. Waiting until the temperature and jaundice had subsided, he was operated. The gall-bladder being considerably distended with fluid and stones, a cholecystostomy was made, a drainage tube inserted into the gall-bladder and the latter fastened into the abdominal wall incision. About forty hours after the operation, hemorrhage to the extent of saturating the dressing took place; the drainage tube was promptly removed and the gall-bladder cavity firmly packed with iodoform gauze. In this way the hemorrhage was completely checked for about eighteen hours; the gauze was then removed and the cavity again packed as before, which again controlled the bleeding for less time than before, when the patient had another severe hemorrhage and died. The post-mortem examination revealed that the bleeding came only from the mucous membrane of the gall-bladder, there being no evidence of hemorrhage from other parts of the body. I resolved, should I ever again meet with a similar case, that I would at once open the abdominal wound and place a strong curved clamp at the lowest point of the gall-bladder and leave it there long enough; place gauze into the gall-bladder as well as around the outside of it, also bringing the omentum up to the incision and leave the abdominal wall wound well open, in this way guarding against infection which might take place, especially should the gall-bladder become gangrenous, which should be expected.

Cholecystectomy in my judgment should never be done in cases where the coagulation time of the blood is not satis-

factory, otherwise dangerous oozing from the raw liver surface may take place. Cholecystostomy with the minimum amount of traumatism would seem to be the safer course.

Mucous fistulae are produced by infection, and impaction of a stone at the juncture of the gall-bladder and cystic duct, producing ulceration and finally cicatricial contraction and obliteration of the lumen. On opening the gall-bladder in these cases, no bile, but mucus instead, is found. If only cholecystostomy is done, a fistula discharging mucus will follow, and the only remedy is cholecystectomy. If the patient is in suitable condition, cholecystectomy should be done at once; if not in good condition, one should be content for the time being with cholecystostomy, as it takes a shorter time and considerably less trauma is produced.

Biliary fistulae are generally produced by the surgeon who by mistake ligates the cystic duct too low, or perchance ligates, crushes or even cuts the common duct itself. This has happened to some of the most distinguished surgeons ever since operations on this part of the body have been undertaken.

In dealing with adhesions in the bile duct region, it behooves the surgeon to be exceedingly circumspect in order not to injure structures here so closely related. Obstruction of the common bile duct sometimes follows many years after the removal of stone. I should like to briefly cite the case of a woman who had suffered a number of years from gall-stone disease. The operation disclosed a contracted gall-bladder filled with a stone. One good sized stone was also lodged in the common duct and in all probability had been there a long time. It was easily removed through a longitudinal incision in the duct which was closed with fine silk. The patient made an uneventful recovery and for over sixteen years enjoyed very good health. Finally, she became gradually jaundiced without suffering the least bit of pain. An exploratory operation was made and a completely obliterated common bile duct was encountered. The patient died about two months later.

BLASTOMYCOSIS: CLINICAL PATHOLOGY AND THERAPEUSIS*

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When Ricketts,¹ in 1901, gave us our first thorough study of a series of cases, blastomycosis was regarded as a disease peculiar to Chicago and its vicinity. It is true that sporadic cases of disease due to yeast-like organisms had been described elsewhere, notably by Busse² in Germany and Gilchrist³ at Johns Hopkins, yet Chicago and its vicinity was the only locality in which the disease was commonly recognized. Time has shown, however, that blastomycosis is no more a Chicago disease than is appendicitis an American disease;

*Presented before the Minnesota State Medical Association, Duluth, August, 1921.

both are world-wide in distribution and probably have been for centuries. It is occasionally recognized not only in all sections of the United States but also in Canada, British Isles, France, Germany, Italy, India, Japan, China and Africa.

Time has not only broadened our knowledge of the geographic distribution of blastomycosis, but has enabled us to learn that the cutaneous form of the disease, so-called blastomycetic dermatitis, is the least formidable of the aspects which the disease may assume. It was early recognized that the cutaneous manifestations may be followed after intervals, sometimes of many years, by pulmonary and general involvement; and also, that general involvement may precede the appearance of cutaneous disease. In other words, a systemic form of blastomycosis has been differentiated and has been found to equal the cutaneous form in incidence and to excel it by far in the gravity of its prognosis. Five years ago, Wade and Bel⁴ of New Orleans advocated the recognition of a third type of blastomycosis on the following grounds: When the blastomycetic infection is limited to an extremity or to the superficial tissues elsewhere, the condition can often be ameliorated and perhaps cured by surgical interference aided by proper medication. "We would direct attention to the much used analogy in tuberculosis, which infection may be cutaneous, as lupus vulgaris, systemic, usually via the pulmonary tissue, or a deep-seated tuberculosis in which generalization of the infection may be avoided by proper measures." Cases of blastomycosis conforming to this picture, Wade and Bel classify as cases of surgical blastomycosis rather than as generalized or systemic.

The lesions of blastomycosis are all characterized by the presence of the specific organism, usually in abundance. The organisms are easily demonstrated by mixing a drop of pus with potassium hydrate on a glass slide and examining unstained, microscopically. The fungi are recognized as circular or oval budding bodies 15 to 30 micra in diameter with a clear, doubly contoured membrane.

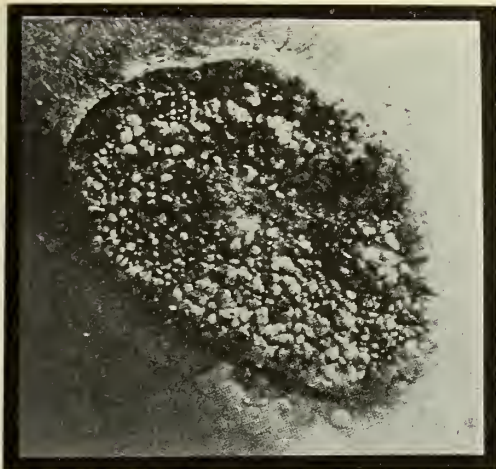
The gross characteristics of blastomycetic dermatitis are constant and pathognomonic. The first finding on the part of the patient, in all cases, is a sluggish, red papule or pustule. If there has been a preceding traumatism he may observe that either the wound does not heal or that apparent healing occurs, the papule or pustule not appearing for several days or weeks later. The primary

papule ordinarily becomes pustular in a short time, and the apex of the pustule transformed into a crust which, when removed, is found to cover an irregular, elevated, reddened base, which secretes a small amount of glary muco-pus; a narrow red areola appears early. Extension takes place steadily so that, in from two to four or six months, the lesion has a diameter of one to two inches. In the meantime the rough granular condition of the base becomes greatly exaggerated and gradually a coarse papillomatous or villiform surface results, the processes of which are separated by deep, irregular clefts, which are filled with pus. In the fully developed lesion the appearance sometimes is decidedly cauliflower-like, the verrucous tissue rising precipitously above and overhanging the surrounding skin. In other cases the papillomatous tissue is more flattened and shows little of the cauliflower appearance; this is always the case in the process of healing.

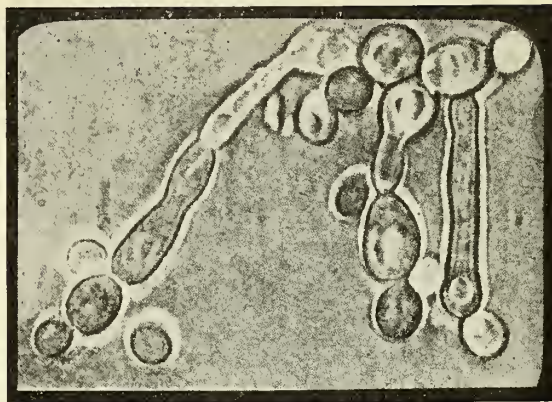
The skin immediately surrounding the verrucous tissue forms a characteristic areola. In the most extreme condition it is red or bluish red, tumid, and rises somewhat to meet the base of the ulcer, possesses an unbroken horny layer and is studded with sub- or intraepithelial abscesses 1 to 1.5 millimeters in diameter. On being pricked they yield a droplet of sticky, glary pus in which the organisms are easily demonstrated. The degree in which these findings are present varies in different cases and in the same case at different times.

When the lesion has covered an area of two inches or perhaps less, the center loses in part, or even completely, its papillomatous surface, becomes depressed below the level of the surrounding tissues, and either appears red, moist and granulating, or it may be dry and show cicatricial healing. In the early stages of cicatrization, it is not uncommon to find scattered miliary abscesses, containing a few fungus cells, in the cicatrix itself even when the verrucous tissue has largely disappeared. Study of sections shows that organisms may remain embedded in the deeper granulation tissue long after healing has been well started. This fact seems to explain the recurrence of the disease when, supposing cure to have been established, the patient ceases medication.¹ A particular focus may heal entirely with no treatment.

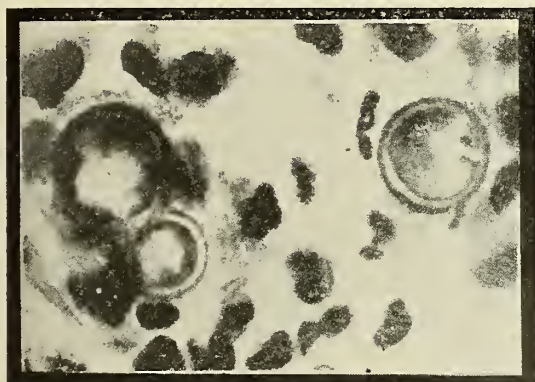
Extension of the disease is accompanied by a direct invasion of the contiguous skin; in most cases there are periods of rapid progression interrupted by periods of relative quiet. There is a



(1) Cutaneous blastomycosis—from a lesion about an inch in diameter. Note the verrucous nature of the lesion, raised above the surrounding skin with a narrow sloping margin. Characteristic millary abscesses appear in this margin from which blastomyces laden pus may be obtained to clinch the diagnosis. Areas of this type have been mistaken for tuberculosis and for epithelioma. They differ from tuberculosis in their more rapid growth and more rapid healing; the verrucous processes are larger, softer and more succulent, and the abscess-studded areola characteristic of blastomycosis is absent in tuberculosis. These same features serve to differentiate epithelioma.



(3) Beginning mycelial formation in cultures. The organisms never appear in this form in the tissues, but in cultures, by varying the media and temperature conditions, mycelial growth may easily be produced. The forms shown here may be said to represent a stage midway between the budding and the mycelial organism.



(2) Smear from pus from blastomycetic abscess. Note the relative size of the fungus, the clear, doubly contoured membrane, and the characteristic budding form. This is the only form of growth assumed by blastomyces in the tissues.



(4) Section from case of blastomycetic dermatitis. Note the marked epithelial overgrowth with active inflammatory reaction in the cutis. The characteristic intraepithelial abscesses, bordered by partially cornified epithelium, are well shown. This picture is typical and different from that found in any other disease.

marked disposition to creep gradually from the point of origin to rather distant areas as in the case of Gilchrist and Stokes,¹ where the disease began as a papule over the left mastoid process, whence it encircled the left ear, invaded the left cheek, chin, palpebral and supraorbital skin, successively, then the bridge of the nose and finally similar points on the right side of the face, the older areas cicatrizing as the borders advanced.

In the cases of blastomycosis beginning as blastomycetic dermatitis, generalization of the infection is quite common (perhaps 50%); but there are no signs of general disturbance such as fever, headache, nausea or pathologic changes in the

urine. Systemic blastomycosis presents a far different picture. At first the patient feels rather run down, there develops daily fever quite irregular in type, emaciation steadily increases in degree with marked loss of weight and the patient begins to cough; shortly after that he develops abscesses that are both cutaneous and sub-cutaneous. The cutaneous abscesses break down into superficial, ill-kept, discharging ulcers. Abscesses in the deeper tissues also become manifest, some reaching large size and rupturing spontaneously. The great majority of cases result fatally. At autopsy, the characteristic lesions are the abscesses with blastomyces-laden pus. These lesions have been described



(5) A few years ago we carried on an investigation of the immunological reactions of blastomycosis.⁵ During that study we were able to follow the process of phagocytosis *in vivo*. This slide is from a smear of the peritoneal exudate of a guinea-pig two hours after the intraperitoneal injection of a suspension of blastomyces. Note how the large phagocytic cells are streaming toward and coalescing about a group of organisms. As the hours pass, these masses become larger and more compact; as the liquid part of the exudate is absorbed they become attached to the peritoneum, are gradually covered over by it and in a few days sections through such nodules will demonstrate the plasmodial mass of leucocytes as a typical foreign body giant cell enclosing blastomyces.

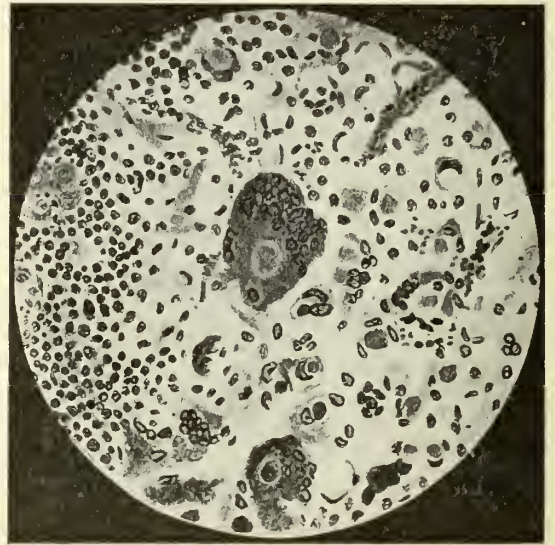
in almost every tissue of the body, including the bones, spleen, kidneys, lymphatic nodes, prostate and brain. In twenty-seven cases discussed by Wade and Bel, there were 169 organ foci, averaging 6.25 organs per case, many organs, of course, containing multiple foci.

In surgical blastomycosis we have deep-seated lesions—subcutaneous, muscular, or of bones or joints, single or multiple, while the lungs and other viscera escape involvement. The infection is confined to a part or parts in such a manner as often to be amenable to surgical treatment in conjunction with other measures. Extension, when it occurs, is either direct or by way of the lymphatic channels.

The microscopic pathology of blastomycosis is characterized in all cases by the presence of the specific organism and, in most, by nothing else. Only in blastomycetic dermatitis is the microscopic pathology characterized by additional findings; here the picture is constant and peculiar. At first glance one is struck by the marked epithelial overgrowth—the cell masses infiltrating the deeper layers of the skin in striking resemblance to epitheliomata. In these cell masses we note small abscesses surrounded by partially cornified epithelial cells and containing, in variable proportions, giant cells (multinuclear and of the foreign body type),



(6) Section from the omentum of a guinea-pig ten days after intraperitoneal injection of a suspension of blastomyces. Note the phagocytic cells, many of the foreign body giant cell type. This nodule, though subperitoneal, is the direct development from a rosette such as that shown on the preceding plate.



(7) Subperitoneal nodule from the liver of the same guinea-pig from which the preceding section was obtained. It shows the invasion of the liver substance by the inflammatory growth and the same giant cell formation. In animals which recover, such nodules become fibrous and disappear in from three to six weeks; in other cases they enlarge, soften, and multiple abscesses may be produced. Organisms may retain recognizable form in tissues for weeks after apparent healing has occurred and have been successfully cultivated on artificial media after a month's apparent quiescent residence in guinea-pig tissue. This is in accord with Rickett's description¹ of normally staining organisms in the scars of healed areas of blastomycetic dermatitis and is again suggestive of a reason for the chronicity of cases of blastomycosis and the occasional flaring up of the process after apparent cure. These slides also suggest the intense cellular reaction against blastomyces which seems to be the chief active mode of defense of the body against blastomycetic infection.

plasma cells, polymorphonuclear leucocytes, epithelial cells showing more or less cornification, endothelial-like cells, tissue debris and blastomyces (sometimes free, at other times imprisoned in giant cells or phagocytic cells of other types). One also finds abscesses containing blastomyces beneath the epithelium but the peculiar, characteristic finding is the intraepithelial abscess.

Recovery in blastomycosis appears to depend largely on the phagocytic and proliferative activity of the tissue cells.⁶ Antibodies are developed in the blood slowly and in relatively small amounts. Both experimental and clinical data suggest that healing of blastomycetic lesions is more the result of phagocytosis and imprisonment of organisms by fibrous tissue than of the interaction of any other factors.

In the treatment of any form of blastomycosis certain general measures are worthy of consideration. As in the tuberculous, fresh air, rest and good food are of prime importance; this is especially true of the generalized cases. Certain drugs have been found of benefit. Potassium iodide by mouth in large doses has for years been routine in certain clinics with good results. Salvarsan, intravenously, has given marked benefit in some cases, while from South America come reports of the efficiency of tartar emetic given intravenously.⁶ Vaccination has not had a thorough trial. Stober was hopeful from the results in one case of generalized blastomycosis, although the case was lost track of before cure was established. From the experimental side, a low grade of immunity has been established in animals by vaccination with an extract of the blastomyces, and recovery seems to have been hastened. The results thus far clinically have been inconclusive.

In cases of cutaneous blastomycosis, in addition to general measures, clean surgical excision is a logical procedure when the lesion is so situated that serious mutilation will not be thus produced. The curette should never be used on the lesions of cutaneous blastomycosis; its use has been followed by rapid generalization of the infection in at least one case. When surgical interference is permitted it should take the form of wide, clean excision. When surgery is contraindicated, good results may usually be expected to follow the use of roentgen ray and radium.

In generalized blastomycosis the strict regimen of a tuberculosis sanatorium would be of great value, supplemented by the drug therapy already

mentioned. Cases of surgical blastomycosis should receive the treatment given generalized cases with additional operative measures as indicated.

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DISCUSSION ON THE PAPER OF DR. BENJAMIN DAVIS

DR. ARTHUR H. SCHWARTZ, Duluth: I want to bring out a few points in the differential diagnosis in cases of blastomycosis on the clinical side. Very often the clinical diagnosis of blastomycosis does not tally with what we see under the microscope.

I want to present lantern slides of three cases that appeared in my department, which will serve to bring out the points in the differential diagnosis. The first is a case of blastomycosis, and I wish to show here the method of advancement of the disease. You will see here a large white scar where the patient originally had the disease, and its method of advancement. I also want to show the multiple abscesses scattered throughout, you see the droplets of glary pus.

This is another picture of blastomycosis showing practically the same type lesion.

This is a picture of an epithelioma, and you will notice here a large ulceration with a bloody crust and yellow edge, a pearly border, and with great destruction of the tissues.

The important point in the differential diagnosis in epithelioma is the pearly border with an inflammatory areola which does not contain the multiple abscesses that blastomycosis does.

We have here a picture of tuberculosis verrucosa cutis of the foot. This condition is most frequently confused with blastomycosis. You will notice here that there are multiple abscesses, the same as in blastomycosis. It has also the elevated border, but it lacks the inflammatory areola. The lesions here are not as numerous as they are in blastomycosis, and the condition is more frequently found in younger individuals.

There is one point I want to mention in blastomycosis, and that is, that ordinarily in our text books it is stated that blastomycosis lacks pain. I wish to say that my experience has been that most of the patients with blastomycosis suffer quite a great deal.

Another point is that blastomycosis has a very peculiar odor quite typical of the disease.

PYELITIS*

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Definition. Pyelitis is an inflammation of the renal pelvis and its calices. It may be associated with pyelonephritis in which the parenchyma of the kidney is involved, or pyelonephrosis where abscesses exist in the kidney substance. These latter conditions are often progressive stages of the same infection, or concomitant. Pyelitis may also be associated with inflammation of the ureter, and bladder.

One should be on the alert for possible involvement of the renal pelvis in all infectious diseases, as well as in all cases of pyuria even if only of mild or moderate degree, for with early treatment most cases can be quickly cured. Depending on the bacterial cause and the state of bodily resistance to infection, will depend the degree and the duration of the inflammation, and likewise the nature and persistence of treatment required.

The greatest aid to diagnosis in infectious conditions of the kidney has come in the development of cystoscopy and ureteral catheterization. Not only have these methods facilitated diagnosis, but they are also valuable factors in therapeutic application, when the disease has been established and recognized.

Etiology. Almost all cases of pyelitis are of bacterial origin. It requires, also, a local factor of diminished resistance to allow the bacteria to attack the kidney pelvis. Normally the kidney pelvis resists infection to a marked degree. If, however, trauma, mechanical obstruction to drainage, or the irritation of certain drugs affect the pelvis, bacterial attack soon takes place. Infection and inflammation may persist for many years without marked destruction of tissues; likewise, bacteria may be excreted in the urine for long periods without affecting the kidney pelvis; but with added irritation, as by stone, or pressure, or urethral stricture or kinking, the integrity of its structures will quickly fail. A "locus minoris resistentiæ" once established, bacterial invasion is usually prompt.

The bacteria most frequently associated with pyelitis are: staphylococcus pyogenes aureus and albus, streptococcus, pneumococcus, typhoid and

colon bacillus, tubercle and diphtheria bacillus, and gonococcus; usually present in pure culture, they may be mixed with other bacteria, due to secondary infection. When bacteria can be demonstrated microscopically, but no growth obtained by ordinary culture and staining methods, one should make anerobic cultures and use special stains. In acid urine, if in doubt, always look for the tubercle bacillus. The micro-organism most frequently present is the colon bacillus, not always as the primary infection, and often as a secondary infection.

Bacterial invasion of the kidney may occur in one of four ways: (1) hematogenous; (2) urogenous; (3) by contiguity; (4) through a penetrating wound.

Hematogenous infection, by far the most frequent source, may occur in any condition in which bacteria are free in the circulation. The pyelitis associated with acute infectious diseases, including the exanthemata, is caused in this metastatic way. Quite recently Bumpus and Meisser¹ of the Mayo Clinic showed from experiment, as well as from the study of clinical cases, the definite relation of focal infections in the teeth and tonsils to pyelonephritis, and cite cases where the removal of these foci not only cleared up the kidney infection, but where inoculation of rabbits with the infectious material from the teeth of these patients caused a similar kidney infection, showing not only the possibility of a hematogenous infection, but also the elective localization of the streptococci for certain organs, as shown also by Rosenow in 1915². They recovered green-producing streptococci in pure culture. These investigators also studied the relative ability of the streptococcus and colon bacillus to grow in otherwise sterile urine, showing the persistent growth of the colon bacillus and the difficulty of growing streptococci. This observation is of clinical interest because of the frequency of finding the colon bacillus in the urine of these patients, in cases where the true cause is a streptococcus or other bacterium and the colon bacillus only a secondary infection. The finding of the latter should therefore not deter us from seeking other sources of infection with the object of their elimination.

Urogenous infection occurs in the presence of urethritis, cystitis, prostatitis, vesiculitis or ureteritis, and is enhanced by any obstruction to the urinary outflow. Infection may travel along the mucous membrane or the ureteral lumen; but in most cases it will be carried from the lower urinary

*Presented before the Southern Minnesota Medical Association, Mankato, December, 1921.

organs to the kidney by the general circulation, via the vesico-ovario-renal anastomosis, or along the blood vessels of the ureter; it may also travel by way of the communicating lymphatics.

By contiguity, infection usually travels from the colon by way of the lymphatics. While the colon bacillus ordinarily is not virulent, in diarrhea, acute appendicitis and intestinal obstruction, the colon bacillus gains in virulence, and the permeability of the intestinal wall seems to be increased.

The method of infection through a penetrating wound is obvious. Occasionally very virulent bacteria may cause inflammation without local defects; and certain bacteria which decompose urea, thus producing substances which are irritant to the kidney pelvis, will cause pyelitis, as for example the diplococcus ureæ liquefaciens and sometimes a staphylococcus albus which decomposes urea.

Accessory factors which determine pyelitis are: lowered general or local resistance due to general disease, constipation, enterocolitis, calculus, nephritis, cystitis with retention, stricture of ureter or urethra, hypertrophied prostate, phimosis, traumatic contusion of the kidney, chronic passive congestion, acute appendicitis, pelvic and general peritonitis, nephroptosis, pressure of adjacent tumors, the pregnant uterus or a distended colon, on the kidney or ureter; and various parasites, such as actinomycosis, filaria, echinococcus, bilharzia.³

Tuberculous pyelitis may be followed by secondary infection with pyogenic bacteria. Paralysis of the bladder due to spinal cord disease predisposes to kidney infection. Gonorrheal infection of the kidney pelvis is comparatively rare, and is usually associated with other bacteria. Instrumentation of the urethra, bladder or ureter may be responsible for lowering resistance or carrying infection to the kidney. Early cases of pyelitis are often unilateral, especially if due to trauma, contiguity, or ascending or urogenous infection. If pyelitis continues any length of time, it usually becomes bilateral; it is most frequently so if caused by a metastatic or hematogenous factor.

While calculus is mentioned as a cause of pyelitis, calculus formation is frequently secondary to pyelitis. This is important to remember, and every case of kidney stone in which nephro-lithotomy is done, should have treatment for the associated pyelitis until it is cured, to avoid recurrence of stone due to this infection. The pressure of the

pregnant uterus is often associated with a toxemia or other infection, in the production of pyelitis. The condition is not rare in pregnancy and should be looked for in all cases of pyuria in pregnant women.

Pyelitis may occur at all ages. Infants frequently suffer from it; soiled diapers (direct infection with the colon bacillus) and phimosis, with extension upward through the lymphatics, are the most frequent source of infection. In infants and children the infection is usually due to the colon bacillus, but may be due to the streptococcus, as in the acute exanthemata. While the condition in children can often be diagnosed by simple means, it may be necessary to resort to cystoscopy for differential diagnosis. In aged patients, paralytic and other obstructive factors are mostly causative, infected teeth and colon stasis also being prominent causes.

Pyelitis may be acute or chronic. In acute cases the mucous membrane is swollen, red, and covered with red blood cells, pus cells, desquamated epithelial cells, mucus and bacteria, and (in alkaline urines) phosphates and oxalates. In chronic pyelitis the mucous membrane is grayish or brownish in color, thickened and sometimes ulcerated. The ulcers sometimes become deep enough to perforate and may cause a perinephritic abscess or establish a fistula into a neighboring hollow viscus. When ammoniacal decomposition of urine occurs, the destruction of the mucous membrane of the renal pelvis is most marked. Rare conditions are gangrenous, fibrinous or membranous pyelitis. The corresponding ureter is usually involved in the inflammatory process, and especially the vesical mouth of the ureter, which latter is a valuable sign in the diagnosis of pyelitis. Stricture, kinking, or other obstruction of the ureter leads to dilatation of the renal pelvis and to hydro- or pyonephrosis, the entire kidney becoming a pus sac eventually. The pus may become inspissated and result in a cheesy and often calcareous functionless kidney, resulting eventually in an auto-nephrectomy. Associated with a pyelitis may be a pyelo-nephritis and a chronic interstitial nephritis.

Symptoms of pyelitis are constitutional and local. The general symptoms depend on the kind and degree of infection. Usually there are toxemia, chills, fever and sweats, general depression, loss of weight and disturbed digestion. In chronic cases the renal irritation will cause polyuria, and in children enu-

resis. Uremia is rare, because both kidneys are seldom the seat of a sufficiently destructive process to cause anuria. In children, obscure fever and sweats, with digestive disturbances and vague abdominal pain, should always make one suspect a possible pyelitis. Fever and sweats are rather capricious in most cases of pyelitis, even in adults. An associated constipation and distension of the abdomen may simulate intestinal obstruction. Sometimes the general symptoms obscure the local ones, and only routine urinalysis and physical examination will determine and localize the disease.

The local symptoms are pain and urinary changes. Increased frequency, with burning urine having a sediment, will give the indication for further examination. In acute cases the amount of urine is usually diminished, although there is an increased frequency. Infection caused by the colon, typhoid or tubercle bacillus is usually associated with an acid urine, and even in cases uncomplicated by nephritis there is albuminuria, due mostly to pus and red blood cells. The microscope shows pus cells, red blood cells, epithelial cells, mucus, fibrin and bacteria. In order to exclude pus and red cells due to contamination by a urethral or vaginal discharge, vesical catheterization should be employed in obtaining a urine specimen. Further localization of the disease is obtained by cystoscopy and ureteral catheterization. This, however, should be avoided in acute inflammation. In these cases other localizing symptoms such as pain and tenderness will determine the diagnosis, in conjunction with urinalysis and the general symptoms. All chronic cases of pyuria require cystoscopy and ureteral catheterization, with chemical, microscopic and bacteriological examination. The process towards recovery or otherwise can best be determined by counting the number of pus cells in an uncentrifuged specimen of urine, obtained by ureteral catheterization. Pain is usually localized over the affected kidney, but may radiate down the thighs and towards the pelvis; there may be but a sense of weight in the kidney region. In children pain referred to the abdomen is often due to pyelitis. Tenderness over the kidneys can be elicited by direct palpation or by the fist percusion of Dr. J. B. Murphy; however, the latter should be done carefully, as it sometimes causes most exquisite pain. By laying the one hand flat over the kidney in the angle between the twelfth rib and the erector spinæ muscle and producing a sharp blow with the

closed fist of the other hand, this sign can be obtained and has a definite value.

Prophylaxis. In general diseases one should sit; as soon as pyuria develops, examine the kidneys by palpation and fist percussion for possible involvement. Give febrile patients no irritating food or drugs and plenty of bland and, preferably, mildly alkaline liquids to drink, or by rectum. Protect the body surface from chill. In disease of the lower urinary organs, avoid unnecessary instrumentation and avoid contamination with infectious organisms. See that the bladder is sufficiently drained and the urinary passages flushed by copious watch the kidneys by sufficiently frequent urinalysis—drinking of bland fluids. Pregnant women should be guarded, by restful positions, against abnormal pressure on the ureters. In nephroptosis, proper support should be worn, to avoid kinking or pressure of ureters. Remove obstructions such as stricture, prostatic hypertrophy or phimosis; also, foreign bodies, as stone of bladder, ureter or kidney pelvis. In open wounds near the kidney, proper asepsis and antisepsis are indicated.

Treatment. If possible, remove the cause first of all; this may be sufficient to effect a cure. In acute pyelitis put the patient to bed, keep the body warm, give large quantities of fluid by mouth and alkalize the urine (this latter is enhanced by giving fruit juices and vegetables and carbohydrates); avoid highly seasoned foods, alcohol, proteins, and irritating drugs. Dry heat to the kidney region is desirable. Open the bowels and use the usual treatment for febrile conditions. If there is nausea, give fluids by rectum.

In acute cases with acid urine, it is best to give potassium citrate in large doses, frequently repeated, to alkalize the urine, after acute symptoms have subsided. A valuable drug is hexamethylenamine, dose according to age (usually 30 to 40 grains a day in adults); this must be given freely diluted, since the urine that is concentrated is very irritating to the bladder owing to the formaldehyde which is being excreted. Hexamethylenamine is effective only in acid urine and should never be prescribed in combination with an alkali. If the urine is alkaline due to fermentation or other causes, give sufficient monobasic acid sodium phosphate to acidify it moderately—but not excessively; usually twice the amount of the hexamethylenamine is sufficient.

Hexamethylenamine should not be used continuously for more than five to seven days, especially if bladder irritation becomes marked. It is well to alternate every five to seven days, using it and the acid sodium phosphate for these days, and then salol with sodium bicarbonate or citrate of potash solution. This alternating method of prescribing urinary antiseptics has a definite destructive action on bacteria, and also is less irritating to the inflamed organs. In children especially, and in very acute cases, citrate of potash is preferable to hexamethylenamine. A good rule is to begin with alkalizing drugs in acid urines, and to acidify the urine when it is alkaline in the beginning, to inhibit bacterial growth—then alternate as above mentioned.

In very severe acute pyelitis, with pyelonephritis, it may be necessary to incise the kidney and drain its pelvis this way, to avoid destructive action of the secreting portion of the kidney, or general intoxication. In perinephritic abscess due to a perforated kidney pelvis, operation with drainage is indicated.

Chronic pyelitis is often very resistant to treatment and sometimes practically incurable. Remove the cause, if possible; institute proper diet, and flush by copious drinking of bland liquids. See that there is no obstruction to the outflow of urine. Remove foreign bodies from the kidney pelvis; keep the bowels active; protect the body surface from chilling. Alternate use of acid and alkaline antiseptics is indicated following a definite routine, and checking up its efficiency by frequent urinalyses. Careful use of stimulating drugs as balsam of copaiba may be beneficial. Improve the general health of the body.

During recent years lavage of the renal pelvis and the instillation of antiseptics, especially the silver salts, has been practiced with great benefit. By catheterizing the ureters and instilling a suitable antiseptic into the renal pelvis, one can often note improvement after one or two treatments. Various drugs have been used for this, such as silver nitrate, silver iodide, or the organic silver compounds. Young, White & Swartz⁴ advocate the use of mercurochrome 220, because it is the least irritating and has the most penetrating quality, reaching the submucosa and deeper tissues. Richet⁵ advises a variation of antiseptics. O'Connor⁶ states that, from a purely experimental point of view, it

would seem that pelvic lavage done alternately with silver nitrate and mercurochrome 220 might give us better results than those achieved by the sole use of either. Geraghty of Baltimore and Kretschmer of Chicago are strong advocates of the use of nitrate of silver alone, claiming that the reaction following its use is to a certain extent responsible for the favorable results obtained. Hagner of Washington, D. C., advocates the injection of Bulgarian bacillus suspension in chronic pyelitis associated with alkaline urine.

Vaccine, autogenous or stock, may be tried, but it is of doubtful value. In pyonephrosis operation is indicated. Drainage through an operative incision may cure the case, especially if no stone, ureteral kinking or tuberculosis exists. In the latter cases, especially with destruction of kidney substance, nephrectomy may be indicated. Of course, the functional ability of the other kidney must first be definitely established, before nephrectomy is performed. All obstruction to urinary outflow must be corrected if possible, by urethrotomy, prostatectomy, ureteral section and plastic, nephropexy, or cystostomy.

SUMMARY

1. The prompt cure of pyelitis depends upon an early diagnosis, and prompt recognition of the source of infection.
2. Focal infection is the most frequent cause, and is often followed by secondary colon bacillus infection.
3. In children pyelitis is of frequent occurrence.
4. Calculus recurrence is often due to a persistent pyelitis.
5. Treatment in acute cases consists of rest, bland diet, alkalization of urine.
6. Chronic cases require elimination of primary infectious focus, alternating use of hexamethylenamine and citrates at intervals of five to seven days. Lavage of kidney pelvis with nitrate of silver and mercurochrome alternately is indicated in persistent cases.

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DISCUSSION ON THE PAPER OF DR. A. E. SOHMER

DR. HARRY P. RITCHIE, St. Paul: This subject may be discussed from many different angles, but Dr. Sohmer has so comprehensively covered it that I shall limit my brief remarks to two clinical observations. Whether we consider this condition we call pyelitis as a primary or associated disease, there is no question but that clinically it is a definite and distinct entity in the exhibition of symptoms.

So far as I am concerned, the diagnosis is not an easy one, but requires a lot of study and examination, and yet the temptation is to meet an emergency situation that is important. I think mistakes are very often made in the

differentiation between pyelitis and acute abdominal pain, and they are due to the fact that the symptoms are so imperative we misinterpret them and do not make a careful study of them. In all of these kidney infections we are supposed to make the diagnosis by exhibiting signs in the urine, but in the early acute processes the kidney may be almost inhibited; and yet it is not infrequent to exclude pyelitis in an emergency situation by one examination of the urine. These patients should be examined carefully. We must remember this thing may come to any one. It is no respecter of persons nor of age, and it may occur to any one at any time, and I think very often we overlook and forget the possibility of it. In adults there seems to be a peculiar mental stage in pyelitis cases, amounting almost to a depression, even to a melancholia, and I think there are hardly any cases more trying and requiring our tact and careful analysis more than these sufferers in whom there is a mental change. I think the first attack is by far the most important one. In fact, it is a question whether they do not have the footprints of this disease for a long time and I think that these people should be called back for repeated examinations later.

In the treatment we have several things that can be used. I don't care very much about dietetics. Rest is very important, and particularly in the pyelitis of pregnancy. Drainage of the kidney by posture is quite necessary, and that is a very essential feature of the treatment. I agree with Dr. Sohmer that the use of urotropin alone gives no clinical evidence of satisfactory or immediate results. It must be used in combination with some form of diuretic.

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No. 5

EDITORIAL

TO ALL MEMBERS OF THE MINNESOTA STATE MEDICAL ASSOCIATION

Attention is called to a letter sent to every County Medical Society of the Minnesota Medical Association, by Dr. Riggs, on Dec. 20, 1921. In this letter, discussion of one of the problems confronting the medical profession of the State is so clearly set forth that we will not take your time to reiterate them. Dr. Riggs' explanation is so clear that these letters should be read again.

The problems of today are: 1st. Lowering the standards of medical treatment by admitting osteopaths and others to full practice of medicine and surgery. 2nd. State Medicine, a substitute for universal Health Insurance. 3rd. Question of insuring support and fealty to Doctors from the laity.

To meet two of these problems, the legislature must be educated. It is only through the people at large having a good understanding of medical conditions that anything can be done in our legislature. Therefore the Council of the Minnesota State Medical Society felt that every component County Society must take up the battle. Each Society should have a committee on legislation. It is desired that the committee should organize public meetings to be addressed preferably by a layman. This speaker should be not only friendly to the medical profes-

sion, but he should have a comprehensive medical vision. It is not selfish interest that inspires this so much as it is a desire to make existence possible for the medical men, whose sole purpose is welfare of humanity. The public must have competent medical care. The Doctors are agencies through which this has come and is to come. They must not be destroyed or harassed. The medical profession has been established for the sole purpose of serving humanity. It has been built up through the efforts of countless individuals. It represents institutions by the score, whose purpose is to maintain efficiency and integrity in its ranks.

Medical education has become so standardized that only the well qualified can enter the ranks of the medical profession. After graduation, education is not neglected. There are County Societies with their courses of study; the State Medical Society and the A. M. A. Association as a final clearing house and mold of ideals. The efforts of the American College of Surgeons to maintain high standards of efficiency has its counterpart in many of the National Societies devoted to various specialties. Add to this the almost endless list of medical journals, the numerous well-attended clinics and the great list of teachers, both in and outside universities and colleges, and one sees that the Medical Profession rests on a strong foundation and that it is an immense structure.

"A license to practice is not an endorsement, but is an instrument to protect the public from the one who is licensed."

Literature and information concerning legislative personnel are in the hands of Dr. J. F. Savage of St. Paul, chairman of committee on legislation.

Direction of the work is under Dr. H. M. Workman of Tracy, Minn., for the organization of County Societies.

Suggestions as to procedure may be obtained from this committee.

J. F. CORBETT,

R. J. HILL,

H. M. WORKMAN, Chairman,
Committee on Publicity.

The Gassed Soldier

The experience of having had a "touch of gas" was so universal among the various units close to the war front that smiles were ordinarily evoked when anyone took a "touch of gas" seriously. A severe dose of gas with its agonizing air-hunger

and often slow but sure death was an entirely different proposition. Between these two extremes ranged various degrees of exposure to the different gasses, all of which produced similar respiratory symptoms.

With the gassed cases that were not fatal, the federal government has had a difficult problem in determining the degree of resultant disability, and has doubtless given a large number of ex-soldiers the benefit of the doubt in the matter of compensation.

An admirable report of a Board of Medical Officers convened at Camp Grant has summarized the results of examination of two thousand gassed soldiers in the chronic stage. Investigation showed that while the symptoms resulting from the various gasses were much the same in the acute cases, those subjected to chlorine poisoning complained mostly of suffocation and of a constricting of the chest; the acute mustard gas cases suffered frequently in addition from epistaxis; phosgene cases complained of a peculiar general weakness in addition to respiratory irritation.

Autopsy reports of acute cases give us an accurate conception of what took place. There has been little opportunity to observe the pathology in chronic gas cases and we are forced to form our ideas of the existing pathology from physical examination, and anemnesis and perhaps most instructive of all a reasoning from the known condition in acute cases. The lung in the acute case is described as being markedly congested, distended and forming, as it were, a non-collapsible cast of the chest cavity. Various grayish areas of emphysema disseminated throughout the congested areas are described. The bronchial mucous membrane is congested and covered by a greenish muco-purulent exudate. Pleural adhesions have been found.

The picture of the acutely affected lung makes possible a very reasonable conception of the chronically diseased lung resulting from gassing. There must be emphysematous areas of variable degree and in the severer cases connected tissue change in the bronchial mucous membrane and in some cases even an adhesive pleuritis.

Many of the chronic cases are perfectly normal so far as methods of physical examination are able to disclose. Some present the harsh, high-pitched breath sounds with moisture disappearing after coughing, the signs sometimes found in chronic bronchitis. A few number are slightly emphy-

sematous and present some chest rigidity, poor excursion of the diaphragm, a poor chest expansion, hyperresonance and diminution of breath sounds.

These men all tell about the same story. They "catch cold easily," cough more or less all the time, are short-winded, have chest pain, burning eyes and feel better when out of doors.

Hill, after studying acute cases, sees no reason "Why recovery of the lungs should be any less perfect after chlorine poisoning than it is after broncho-pneumonia." The Camp Grant observers feel that "there is no apparent reason why these subjects should not regain normal respiratory functions and rid themselves of their gradually disappearing symptoms."

It would seem that the condition need not be a progressive process similar to the ordinary emphysema, which results in right cardiac strain. The consensus of opinion seems to be that a gassed individual is not predisposed either to the contraction of pulmonary tuberculosis nor the activation of an already present focus. Nevertheless, there would seem to be no reason why a gassed case should not develop pulmonary tuberculosis.

These chronic gassed cases doubtless have a reduction in their oxidation mechanism which, in most cases, is impossible to accurately gauge.

Whether the recent agreement at the Washington Conference results in successfully eliminating the use of warfare gas on the part of the nations concerned or not, our recent experience with this new method of warfare adds simply another argument against the time-honored method of settling international disputes by war.

Medical Advisory Committee

The following resolutions were adopted by the Blue Earth County Medical Society at its last regular meeting, Jan. 30, 1922:

RESOLUTION

WHEREAS, the Public and Profession are being sold out to

- (1) Foundation control of "full time" medical education.
- (2) Lay board domination and the "closed shop" hospital.
- (3) Socialized state medicine, subsidized community health centers and hospitals under political or university control.
- (4) Legislative dictation of therapy and fees.
- (5) Demoralization of medical standards by the expansion of cults.
- (6) Exploitation of the specialties by lay technicians.

THEREFORE, BE IT RESOLVED that all the Delegates of the Minnesota State Medical Society to the A. M. A. meet-

ing in St. Louis, Mo., May 22-26, 1922, are hereby instructed to vote for

- (A) A change of policy and leadership in the A. M. A. pledged to the immediate abolition of the evils mentioned, and constructive protection of medical interests.
- (B) The repeal of multiple representation and plural voting privilege by Section Delegates.
- (C) The election of Trustees for a period of two years; five Trustees to be elected one year, and four the next, to prevent the Trustees from perpetuating oligarchical rule.

BE IT FURTHER RESOLVED that copies of these Resolutions be sent at once to the Official Organ of the Minnesota State Medical Society, the Journal of the A. M. A. and the Medical Advisory Committee.

(Signed) A. M. SNELL, Secy.

Passed January 30, 1922.

The above resolution has been widely distributed and, presumably, to each of the component county medical societies of the State Association by the Medical Advisory Committee.

To date the only Minnesota society which has adopted this resolution is the Blue Earth County Society, which took favorable action on January 30, 1922.

It should be explained that the Medical Advisory Committee is a self-constituted committee of A. M. A. delegates who took exception to some of the policies favored by certain officers of the association at the Boston and New Orleans meetings. Dr. Ochsner, of Chicago, is chairman, Dr. Rooney, of Albany, vice chairman, and Dr. McMecham, of Ohio, secretary. The membership includes the names of many prominent physicians throughout the country.

Although the above resolution is rather vague and appears to be the outburst of a group of spirits opposed to the "status quo" of the medical profession in general, blaming existing evils on the present administration of the A. M. A., they have certain specific complaints and propose definite remedies.

One complaint is to the effect that certain high officials of the A. M. A. strongly favored compulsory state health insurance in 1916, are now condemning it and favoring the community health center, which, it is claimed, is only a species of socialized medicine.

The Shepard-Towner Act is classed as a wedge for socialized medicine and an instance, among many, where the practice of medicine is being taken out of the hands of the profession. The officials of the organized profession are charged with sins of

omission in allowing such a bill to pass. We do not think so.

Attention is called to the fact that the Bureau of Vocational Training for Veterans authorized and has at present ex-soldiers in training at schools for chiropractic. The A. M. A. is accused of having made no effort to block such a regulation, which was doubtless the result of political pressure brought to bear in Washington. As a matter of fact vigorous protests by the council succeeded in postponing this regulation, which was passed two years ago in spite of the protests. Recently this regulation has been rescinded.

The dearth of regular practitioners is deplored and laid at the door of the Rockefeller Foundation, which put many small medical schools out of existence through Flexner's report several years ago. The rapid growth of cults such as osteopathy and chiropractic is attributed to this lack of regularly trained medical men. This lack of medical men may exist in certain God-forsaken parts of the country but statistics show no proportionate dearth of physicians through the country.

Other causes for dissension are: Medical student body limitation, the teaching of ultra-scientific courses, the great increase in the cost of medical education, the "closed-shop" hospital, the invasion by the government of the field of medical practice in the matter of regulation of drugs, alcohol, child-birth, etc., etc.

The Advisory Committee seeks a remedy for ills in a change in the official personnel of the American Medical Association. In order to effect a quicker change in officers a change in the Constitution is advocated whereby Trustees are to be elected for two instead of three years. An elimination of the voting power of delegates representing the scientific sections is also advocated so that the House of Delegates will represent the component State Associations only. This is a question of organization and will be decided at the May meeting by the delegates themselves. It should be stated, however, that short terms of office has one important disadvantage in that a two-year period is a rather short time for a medical man to become thoroughly acquainted with the various duties of a Trustee.

Lively discussion of the various medical problems is a healthy sign and of distinct value. Only through discussion are medical policies to be formulated. The Medical Advisory Committee has performed a distinct service in this line. On the other hand, its criticisms seem for the most part destruc-

tive. The practice of medicine has shown marked changes in several aspects within the last decade or two and there has been a decided realization of the value of preventive medicine. While the medical profession individually realizes the value of prevention of disease it is a question whether the organized profession has done its share in the matter of the instituting of constructive preventive policies. Numerous preventive activities have been inaugurated by the laity, for example the anti-tuberculosis societies, tuberculosis preventoriums, the Life Extension Institute and similar organizations, child welfare clinics and now the maternal and infant welfare activities. These are distinctly medical enterprises and while the profession has been more or less represented it is important that medical men should realize their responsibilities and be more actively concerned. As to how this is to be done, the Medical Advisory Committee does not offer a bit of constructive advice.

Compulsory State Insurance was favored by certain officers of the A. M. A. a few years ago. At least one of their officers recently stated that this issue is now a dead one. The agitation seems to have been transferred to the question of community health centers and legislation is being actively advocated, notably by the Missouri Tuberculosis Association, for State support of these centers.

What is to be the attitude of the professions on this issue which provides for State aid or support of medical centers which will be in the nature of hospitals and dispensaries?

It is interesting to reflect on the source of the maintenance of the present-day hospitals and dispensaries. Some are in whole or in part supported by city or county, or, in the case of the private hospitals, by private subscriptions or endowments or by a group of staff physicians themselves. The last mentioned strictly private hospitals are more common in the smaller towns and constitute a small minority. As a result many of the sparsely populated districts go without.

How will the general institution of community medical centers affect the medical profession? It need not affect the present personal relations between doctor and patient at all. It may result in socialized medicine—the group treatment of a group—unless the profession is active in guiding what is likely to be inevitable legislation. In any case large appropriations will come under the influence of politics.

Is the establishment of community health centers by the state going to remedy the deplorable lack of medical instruction and care in the sparsely populated districts of our country? This is the question to be thrashed out by laity and profession alike. And in approaching the question the profession, while standing for its rights, must not lay itself open to the accusation of selfishness. Reports indicate very conclusively that the people of the country as a whole as compared with foreign countries are not receiving the medical care they are entitled to, particularly in the matter of prevention of disease. Who is going to take up this phase of the work which is so largely educational? The medical profession should.

The Child's Health

The question of the child's health deserves the serious consideration of parents, educators and doctors.

The proper physical, mental and moral development of a child is in a very large measure dependent on right home influence. Discipline is a greater kindness than uncontrolled generosity, which is many times a form of selfishness in parents. Schools and other agencies cannot supplant a good home, nor should they be expected to assume parents' responsibilities.

Educators in general should realize that health, physical and mental, must take precedence over any scholastic demand. Such a realization would tend to facilitate school work and prove beneficial to teachers and pupils.

The director of hygiene in schools should rank with the director of education and in matters of health be supreme. Presumably a doctor knows better how to choose a text-book on hygiene than does an instructor of gymnastics.

A greater interest on the part of the physician in preventative medicine is needed. His duty begins somewhere at a point before a morbid condition presents. It does not cease with the performance of an operation or the writing of a prescription.

Leadership in health matters must remain in control of the medical profession, which is ostensibly best equipped for that work. Service in its broadest sense is the great requisite of this leadership. The tendency of doctors to overlook this, to wrap themselves in a cloak of superiority and splendid isolation, means state medicine, which would be an unfortunate result for doctor and patient alike.

OBITUARY

Cyrus Northrop

The passing of Cyrus Northrop, President Emeritus of the University of Minnesota, stirs again the memory of the many years in which his fostering fatherhood, his broad vision, his untiring counsel prepared the way for the progressive development of the Medical School. We remember gratefully how his guiding hand held the helm for us in many a rough passage of those early days; how he ever held our head up into the wind to keep the course that his faith in the future of the school approved. We recall the inspiration which he constantly gave to the University and the School, toward a love of the work for the work's sake, toward high educational ideals, toward the cultivation of a spirit of service—a true University spirit—among us.

His memory, the memory of the man he was and the work he did, will be cherished so long as the University of Minnesota, the monument his brain, his hand had chiefly reared, to the honor of the State and the highest welfare of her citizens, endures.

DR. PIERRE A. HILBERT

Dr. Pierre A. Hilbert was born in the Grand Duchy of Luxemburg in the year 1865. Nationally he was a mixture of French and German. His parents had known prosperity in the doctor's younger days and were able to give the older children, especially his brother and himself, the advantages of a university education in Luxemburg.

Financial adversity overtook his father and necessitated the taking of the two boys, Ferd, the elder, and Pierre, the younger, out of college before they had finished their college education in Europe. The old gentleman was of a happy turn of mind and told them not to worry because they would soon be in America, where they would break "*a la forchet*," meaning that they would soon be in a country where they would be so prosperous that they could have meat for breakfast, and, therefore, would need a knife and fork.

They came to Minneiska, Minnesota, near Winona, when the doctor was nineteen years old. The doctor, in his early days, worked on the farm, attended Winona Normal and taught school. He acquired a knowledge of English very rapidly, spoke the German language perfectly and had a working knowledge of the French language. He entered the state university as a medical student in 1890, graduating in the class of '93.

In 1891 I first became acquainted with the Hilbert boys, Ferd and Pierre. The elder brother Ferd was that well-grounded in the knowledge of Greek and Latin and the modern languages that he never needed and never owned a medical dictionary, and I do not recall ever finding a

word in the literature or vocabulary, used commonly by the medical profession, that he could not define instantly because of his intimate knowledge of the languages mentioned.

Pierre Hilbert, younger of the two, was not so proficient a scholar nor was he so philosophical as his older brother. He had a keen, perceptive mind, however, and was quite resourceful, managing to get by his quizzes, all save anatomy, and probably Dr. Hendricks, who then taught anatomy and whose personality and questions were so abrupt at times, frustrated the student, Pierre Hilbert. However, he made his grades with greater ease than the average student. He did not pore over books much; he didn't need to.

The class of '93 was the first class to graduate on the campus at the state university, the previous classes having graduated from what is now the old Asbury or Deaconess home.

I also must mention that the class of '93, because of real and imaginary disadvantages mostly necessitated by events over which the medical faculty had no control, went out on a strike, drawing up resolutions, sending one copy to the President of the Board of Regents, one copy to President Northrop, and one copy to Dr. Millard, who was then Dean of the Medical School. The senior class walked out in a body, with the exception of two women students. The various professors, for a number of days, lectured to empty seats and these two women students. Dr. Millard told us that we could return by apologizing to the faculty "individually or collectively." We flatly refused and were reinstated without any apologies.

It was along about the spring of the year that the prospective graduates were looking out for new locations, the all-important thing to the younger doctor. Dr. Hilbert's correspondence was with the widow of a doctor who had practiced in Melrose. He used to show and translate her letters. In one of them she said that "the doctor who located in Melrose and who would attend to business, leaving booze alone, would grow "*stein reich*," meaning stone rich. She was a prophetess. Dr. Hilbert had the qualities of thrift, and prosperity was innate in him. He did not need to acquire thriftiness and in that respect his career was in marked contrast to the average doctor. I used to fear that he would bend his splendid faculties to the acquiring of money alone and would neglect the welfare and forget the humane side of his profession. However, that was not the case. He was the right man in the right place. Melrose has, tributary to it, a very fertile soil and the most economic and prosperous people. Even in the hard times of '93 the doctor did not lose 1 per cent of his earnings. He understood the class of people with whom he worked. He knew the difficulty of prying the dollar loose from the stolid German; but he had a faculty of doing that, at the same time making his client feel satisfied.

It used to be amusing to meet with Drs. Ferd and Pierre Hilbert, as I often did, in consultation. They usually spoke English; if they did not want me to understand they would speak German. If there were Germans around they might resort to French and then no one could get it. As he grew in years and experience he had developed an aptitude for politics. Appointments seemed to come to him unsolicited. To my mind in that particular line he was somewhat of a conundrum. He expressed his views tersely and

to the point and often, I thought, recklessly. In temperament he was of the Rooseveltian type. He could be conciliating or brusque; abrupt and sometimes overbearing. However, those who did not agree with him were compelled to respect him, if not fear him. Opposition seemed to develop this quality; in fact, I sometimes thought that he enjoyed it. Whatever he did he put a personality and intensity that you often observe in men of character. He'd play "penny ante" with as much intensity and scrutiny as if he was putting over a 100,000 dollar deal.

He was a loyal friend—a friend who could see the faults of his friends and was as free to criticize as he was to compliment and encourage.

Dr. Hilbert, in matters of importance, was free to express his opinions and define them regardless of professional or business consequences.

When the great World War broke, Dr. Hilbert's intimate acquaintance with European affairs, his knowledge of the temperaments and customs of the French and German people and the designs, you might say, of the Prussian power, caused him to be an ardent and an earnest defender of the cause of the Allies. His location, his environment, his patrons and the interest of his profession and business, had they been consulted, would have induced a weaker character to at least be silent during the great crisis. He was quick to detect sham and was equally quick to rebuke it. He had little time for the shyster, either in business or politics. He was fortunately so situated financially that his bread and butter was assured without the salary that went with the job. His alertness in discovering or discerning selfish motives together with his independence in politics made him a useful member of the board and enabled him to render great service to his state.

Personally the compliment Hamlet paid to Horatio comes as near fitting Dr. Hilbert as anything I could say:

"Since my dear soul was mistress of her choice,
And could of men distinguish, her election
Hath seal'd thee for herself: for thou hast been
As one, in suffering all, that suffers nothing;
A man that fortune's buffets and rewards
Hast ta'en with equal thanks: and blest are those
Whose blood and judgement are so well commingled
That they are not a pipe for fortune's finger
To sound what stop she please. Give me that man
That is not passion's slave, and I will wear him
In my heart's core, ay, in my heart of heart,
As I do thee."

A. J. GILKINSON.

Dr. Earl E. Cannady, of Prior Lake, Minn., died at Monrovia, Cal., March 30th where he had gone a short time before in quest of health. Dr. Cannady was thirty-seven years of age and had been in failing health for the past two years.

Dr. G. MacMurphey, who has been practicing at Ortonville for many years, died at his home there in March.

Dr. Jacob Eaton Bowers, Duluth, Minn., graduate of Michigan Medical School, Ann Arbor, 1869; formerly superintendent of the Rochester State Hospital, Rochester, Minn., and connected with the State School for the mentally deranged, St. Peter, died, February 23rd at St. Luke's Hospital. He was 80 years of age.

John J. Donovan, M. D., Litchfield, Minn., graduate of University of Minnesota, age 42 years, died March 32rd. Dr. Donovan served overseas during the war.

Dr. Norman C. Davis, of Badger, Minn., was found dead in his drug store a week ago. Dr. Davis was 65 years old and death was attributed to heart disease.

Dr. J. M. Buchanan died recently at his home at Green Isle, Minn.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

AMERICAN COLLEGE OF PHYSICIANS

At the convocation of the American College of Physicians, held at Minneapolis, April 7th, about 120 physicians from United States and Canada were admitted to fellowships. Among those from Minnesota were Dr. Charles Lyman Greene, Dr. R. I. Rizer, Dr. A. H. Beard, Dr. Hugh Willson, Dr. J. Fowler Avery and Dr. S. Marx White. The president of the American College of Physicians, Dr. James M. Anders, was made a master of the American College.

After the annual dinner addresses were given as follows:

(1) Dr. Leonard M. Murray of the University of Toronto, Toronto, Canada, on "Subacute Bacterial Endocarditis." (2) Dr. Aldred Scott Warthin, Professor of Pathology and Chief of the Department of Pathology, University of Michigan, on "Excretion of Spirocheta Pallida Through the Kidneys" (with lantern slide demonstration). (3) Dr. James M. Anders, President of the American College of Physicians, delivered the Annual Oration.

Dr. Murray presented a remarkably large series of cases of subacute endocarditis occurring in returned soldiers in Canada. He outlined the history of the disease, laying emphasis on its insidious onset without distinctive symptoms but with increasing breathlessness on exertion and with moderate anemia. He paid particular attention to the complications such as embolism in cerebral arteries, peripheral arteries, in liver and spleen, with the accompanying clinical manifestations. Certain peculiar forms of the condition were described and the diagnosis based upon blood culture and the changing phenomena dependent upon valvular involvement were described. One particularly interesting observation was that of rapidly developing mitral stenosis due to aneurism of the mitral valve invading the valvular orifice and giving under observation the development of the presystolic murmur typical of mitral stenosis. This rapid development of signs of mitral stenosis could, he stated, occur in no other condition. A remarkable collection of carefully preserved specimens of the condition was exhibited.

Dr. Warthin compared the problem of the excretion of spirocheta pallida through the kidneys with that of the excretion of spirocheta ictero hemorrhagica in epidemic jaundice, and by a masterly study of the conditions in some unusual cases of syphilis showed that the spirocheta in this condition appeared to be modified and caused to undergo

degenerative changes within the epithelium of the kidney tubules. When the spirochetæ had reached the lumen of the tubules they had been rendered unrecognizable as spirochetæ, and he stated that it would appear probable from his material that although in the early stages of the disease the spirocheta may reach the kidney and be excreted, it is not probable that they can be recognized in the urine. The possible relationship between renal spirochetosis and certain cases of death after salvarsan was considered.

In his presidential address, Dr. Anders outlined the function of the American College of Physicians as a body having a distinct purpose in the advancement of standards and of research in medicine, and took up the relationship which the college holds to the medical profession in the United States and Canada and the profession of foreign countries.

The program of daily clinics and demonstrations at the University of Minnesota covered a wide range of subjects in general medicine, pharmacology, pediatrics, neurology, actinology, the borderline between surgery and medicine, dermatology and the laboratories. Demonstrations were given also at the Health Department, Minneapolis City Hall; Glen Lake Sanatorium, the Hennepin County Sanatorium for Tuberculosis, and at the Students' Health Service. The visitors uniformly expressed appreciation of the advanced work going on in these fields.

SOUTHWESTERN MEDICAL SOCIETY

B. O. MORK, M.D., President
Worthington, Minn.

WM. A. PIPER, M.D., Sec'y & Treas.
Mountain Lake, Minn.

The semi-annual meeting of the Southwestern Society will be held at Heron Lake, Minnesota, on May 18th, 1922. The Society membership embraces the physicians of Cottonwood, Jackson, Rock, Nobles, Murray and Pipestone Counties. Among the visiting physicians who will take part in the program are Dr. A. M. Snell, Mankato, and Dr. S. R. Maxeiner, of Minneapolis. Outside physicians will be welcome and the most interesting program is assured.

THE ST. LOUIS MEETING OF THE AMERICAN MEDICAL ASSOCIATION

The American Medical Association is a scientific organization but is composed of members with more than the average amount of "humanity" in their makeup with social elements too long repressed. These members are weary from bearing the responsibility of many human lives. Instead of having play time they have become public teachers with no recess. The local entertainment committee of the A. M. A. have been busy preparing to show these visitors true St. Louis hospitality and to provide for them such diversions as will be both restful and entertaining.

The golfers will arrive early in order to participate in the Annual Tournament on Monday, May 22nd.

Tuesday evening the Opening Meeting will be held in the Odean and arrangements are being made to have the music and addresses transmitted by radio to various parts of the city and to distant cities.

Wednesday evening is given over to banquets such as Alumni, Fraternal, Sectional, etc. On this evening provision is being made to entertain the visiting ladies and those doctors who are not engaged at the Alumni and Fraternity dinners at one of St. Louis' noted moving picture shows with special musical and other features for the occasion.

On Thursday afternoon the Medical Department of Washington University is giving a special Tea on the grounds of the institution. Thursday evening will be given over entirely to the President's Reception and it is hoped that as many as possible of the doctors and their ladies will grace the occasion with their presence.

The committee after visiting the offices of the Mayor and the Director of Public Welfare and being assured of their co-operation have decided to reserve until Friday evening the chief feature of their entertainment by giving a special program for the entire association in the unique open-air Municipal Opera which has a comfortable seating capacity of ten thousand. The location of the opera in the heart of Forest Park with its special lighting effect made possible by the natural foliage of the forest can be appreciated only by those who visit it at night. It is the hope of the committee that every visitor at the convention will remain in St. Louis through Friday evening.

The Ladies' Entertainment Committee under the leadership of Mrs. Willard Bartlett has arranged to take immediate charge of every lady visitor who may be persuaded to accompany the medical member of the family to the convention. They need have no fear of being left alone while the doctor is attending the scientific meetings, for practically every hour of their time has been arranged for and it is hoped that many more ladies than usual will visit the "City of Homes"—"The Friendly City."

A special visit to the Missouri Botanical Garden is being arranged and will be an important item in the entertainment program. Among other features to be shown will be an old Italian Herb Garden. St. Louis is justly proud of its world-famous Botanical Garden.

Take the whole week off, doctor, and spend it in St. Louis. It will be time well spent. You may lose a patient, some may get well during your absence, but your increased vigor when you get back will abundantly make up for any losses. Come to our party for one full week.

Dr. C. E. Burford, 3525 Pine St., is Chairman of the Entertainment Committee.

ANNUAL MEETING OF THE AMERICAN ACADEMY OF OPHTHALMOLOGY AND OTO-LARYNGOLOGY

MINNEAPOLIS AND ST. PAUL

September 18th to 23rd, 1922

The Minnesota Academy of Ophthalmology and Oto-Laryngology will be the host of the American Academy of Ophthalmology and Oto-Laryngology during the week beginning September 18 to 23, 1922. Headquarters of this meeting is to be at the Radisson Hotel, Minneapolis. Most of the meetings will be held in the Men's Union Building at the University. A smoker is to be held in St. Paul one evening of the week, and a dinner dance is to be held at the Lafayette Club, Lake Minnetonka, some time during the session. The last two days of the session will be de-

voted to an educational course similar to the one held in Philadelphia this fall.

The local committees appointed for the coming meeting are:

LOCAL COMMITTEE

Dr. Horace Newhart, Minneapolis	- -	Chairman
Dr. Carl L. Larsen, St. Paul	- -	Vice-Chairman
Dr. John H. Morse, Minneapolis	- -	Secretary
President Lotus D. Coffman, University of Minnesota	- - - -	Ex-Officio
Dean E. P. Lyon, Dean, University of Minnesota Medical School	- - - -	Ex-Officio
Dr. W. L. Benedict	Dr. W. R. Murray	
Dr. F. E. Burch	Dr. L. A. Nelson	
Dr. J. F. Fulton	Dr. Arthur E. Smith	
Dr. J. D. Lewis	Dr. E. S. Strout	
Dr. Thomas McDavitt	Dr. J. A. Watson	
Dr. J. S. Macnie	Dr. J. S. White	
Dr. H. McI. Morton		

SUB-COMMITTEES

Finance—Dr. E. S. Strout	- - -	Chairman
Reception—Dr. H. McI. Morton	- - -	Chairman
Entertainment—Dr. J. D. Lewis	- - -	Chairman
Publicity—Dr. Arthur E. Smith	- - -	Chairman
Meeting Places—Dr. W. R. Murray	- - -	Chairman

MINNESOTA ACADEMY OF OPHTHALMOLOGY

The Minnesota Academy of Ophthalmology and Otolaryngology gave a dinner on the evening of April 12th at the Minneapolis Club in honor of the physicians attending Minneapolis Clinic Week. Dr. Carl L. Larsen presided. Following the dinner, which was attended by fifty-three members and guests, a Symposium on Mastoiditis was given as follows:

1. The Surgical Anatomy of the Temporal Bone—Dr. J. S. Reynolds.
2. The Diagnosis and Treatment of Acute Mastoiditis—Dr. F. J. Pratt.
3. The Management of Complications following Mastoidectomy—Dr. J. D. Lewis.
4. The Etiology and Pathology of Chronic Mastoiditis—Dr. Douglas Wood.
5. The Indications for the Radical Mastoid Operation—Dr. E. S. Strout.
6. The Technique of the Radical Mastoid Operation—Dr. Horace Newhart.
7. Discussion—Dr. J. S. Macnie, Dr. J. G. Ericson, Dr. J. A. Watson.

It was announced that Dr. Fuchs, of Vienna, will arrive in the Twin Cities on May 29, to give a series of lectures on the Pathology of the Eye, for one week. These lectures will be given at some hour late in the day, at some convenient meeting place and will consist of talks upon chosen subjects of one and one-half to two hours each. The cost of the course is \$25.00 per man. Consultation work at which men of the Northwest may call in Dr. Fuchs for his opinion in selected cases is requested. Dr. Horace Newhart is the chairman of the committee arranging for Dr. Fuchs' visit.

JOHN H. MORSE, Secretary.

SOUTHERN MINNESOTA MEDICAL ASSOCIATION MID-SUMMER MEETING

June 19 and 20, 1922

ROCHESTER, MINNESOTA

OFFICERS

Dr. W. F. Braasch, Rochester	.....	President
Dr. W. H. Condit, Minneapolis	.....	1st Vice President
Dr. G. H. Luedtke, Fairmont	.....	2nd Vice President
Dr. H. T. McGuigan, Red Wing	.....	Secretary-Treasurer

Among the speakers from outside of the state who will be guests of the association and will appear on the Scientific Program are:

Dr. W. B. Cannon, Boston, Mass., Dr. Judson Daland, Philadelphia, Pa., Dr. Fred H. Albee, New York City, N. Y., Dr. William B. Coley, New York City, N. Y., Dr. George E. Shambaugh, Chicago, Ill., Dr. Willis Campbell, Memphis, Tenn., Dr. Herman L. Kretschmer, Chicago, Ill., Dr. Preston H. Hickey, Detroit, Mich., Dr. Nathaniel G. Alcock, Iowa City, Ia., Dr. George V. I. Brown, Milwaukee, Wis., Dr. M. G. Seelig, St. Louis, Mo., Dr. George W. Heuer, Cincinnati, O.

The program for the forenoon sessions of Monday, June 19, and Tuesday, June 20, will consist of Surgical and Medical Clinics, and demonstrations in all departments at the following hospitals:

St. Mary's Hospital, Colonial Hospital, Worrell Hospital, Curie Hospital, Olmstead Hospital, Clinic Building.

The program for the afternoon sessions will consist of Scientific Papers, and the Mid-Summer Banquet will be held at the Gymnasium, High School Building, Monday evening, June 19, 1922, at 6:00 p. m.

Make your hotel reservations early by addressing Mr. Roy Watson, chairman Committee of Arrangements, Southern Minnesota Medical Association, Rochester, Minn.

The official program will be published by May 15, 1922.

Attention is called to the importance of securing a certificate when purchasing ticket to Rochester. Said certificate when countersigned by the secretary-general of the association will entitle the holder to half fare return ticket.

COMMITTEES

Program Committee: Dr. H. W. Meyerding, Chairman, Rochester, Dr. J. C. Staley, St. Paul, Dr. B. P. Rosenberry, Winona, Dr. Aaron F. Schmitt, Ex-Officio, Minneapolis, Minn., Secretary-General, 705-707 P. & S. Building.

Executive Committee: Dr. A. W. Adson, Chairman, Rochester, Minn., Dr. A. C. Strachauer, Minneapolis, Minn., Dr. W. J. McCarthy, Madelia, Minn.

Committee on Resolutions: Dr. J. H. Adair, Chairman, Owatonna, Minn., Dr. F. R. Huxley, Faribault, Minn., Dr. C. C. Allen, Austin, Minn.

Committee on Nominations: Dr. M. C. Piper, Chairman, Rochester, Minn., Dr. George Stevens, Byron, Minn., Dr. W. H. Rowe, St. James, Minn.

Committee on New Members: Dr. W. C. Portmann, Chairman, Jackson, Minn., Dr. F. A. Willius, Rochester, Minn., Dr. J. T. Schlesselman, Mankato, Minn.

Committee on Necrology: Dr. J. E. LeClerc, Chairman, Le Sueur, Minn., Dr. G. B. Weiser, New Ulm, Minn., Dr. C. J. Holman, Mankato, Minn.

Committee on Clinical Research: Dr. H. Z. Giffin,

Chairman, Rochester, Minn., Dr. W. H. Valentine, Tracy, Minn., Dr. S. M. White, Minneapolis, Minn.

HOTELS

ROCHESTER, MINNESOTA

1. The Kahler—American—\$5.00 to \$8.00, including meals.
2. Hotel Zumbro—European—\$1.50 to \$4.00, room only.
3. The Damon—European—\$1.50 to \$4.00, room only.
4. Hotel Martin—European—\$1.50 to \$3.50, room only.
5. Hotel Arthur—European—\$1.50 to \$2.25, room only.
6. Hotel Carlton—European—\$1.50 to \$2.50, room only.
7. The Campbell—European—\$1.50 to \$3.00, room only.
8. Cook House—European—\$1.00, \$1.25, \$1.50, \$2.00, room only.
9. Norton Hotel—European—\$1.00, \$1.25, \$1.50, \$2.00, room only.
10. Brown Hotel—American—\$2.50-\$3.50, including meals.
11. Security Hotel—European—\$1.25-\$2.00, room only.
12. Edwards Hotel—European—\$1.25-\$1.75, room only.
13. Northern Hotel—European—\$1.25-\$2.00, room only.
14. Commercial—European—\$1.00 per day, room only.
15. Francis—European—\$1.00-\$1.25, room only.
16. Norman—European—\$1.25-\$1.75, room only.

OF GENERAL INTEREST

Dr. A. E. Eshlin has again been elected mayor of Leroy, Minn.

Dr. Henry B. Grimes, of Madelia, was recently elected mayor without opposition.

Dr. Harrington has returned to the Mayo Clinic after a six weeks' trip in Europe.

Dr. Lewis D. Derdiger, formerly of Battle Lake, Minn., has removed to Minneapolis.

Dr. P. D. Carman has been elected an honorary member of the Roentgen Society of London.

The next meeting of the Red River Medical Society will be held at Crookston in September.

Dr. and Mrs. F. N. Hunt, of Fairmont, have returned home from a two months' trip to California.

Dr. S. R. Meaker, Dean of Harvard Graduate School of Medicine, visited the Mayo Foundation last month.

Dr. H. D. Burns and Mrs. Burns, of Albert Lea, have returned home from an extended visit in Southern California.

Dr. Owen W. Parker, of the Shipman Hospital staff, has just returned from a trip to Florida and other parts of the South.

Dr. Otto W. Schlopp, of Hutchinson, Minn., has gone to Vienna, Austria, where he will take post-graduate surgical work.

The Shipman Hospital at Ely, Minn., recently installed a new Bucky-Potter Diaphragm and x-ray table to their x-ray equipment.

Dr. Andrew J. Gilkinson was elected mayor of Osakis, Minn., in March, having a majority of seven over his nearest opponent.

Dr. Geo. E. Putney and Mrs. Putney, of Paynesville, Minn., have returned home after a visit with relatives and friends in Kansas City.

The fellowships will be administered by a special committee known as the Medical Fellowship Board of the National Research Council.

Dr. J. J. McKinnon, of Wadena, sustained a broken leg a few weeks ago in a fall on an icy sidewalk. He is reported as convalescent.

Dr. M. H. Cremer, of Red Wing, accompanied by Mrs. Cremer and daughter have returned from a three weeks' visit in Illinois and Kentucky.

Dr. Clifford I. Oliver and Mrs. Oliver, of Graceville, Minn., have returned home after a vacation lasting several weeks at Excelsior Hot Springs, Mo.

Correspondence concerning the fellowships should be addressed to the Division of Medical Sciences, National Research Council, Washington, D. C.

Dr. Wilson and Dr. Robertson, of Rochester, attended the Conference on Medical Education of the American Medical Association held in Chicago recently.

Dr. R. L. Latchem, who completed his fellowship in Urology, left the Mayo Foundation recently to locate at 532 Davidson Building, Sioux City, Iowa.

The Curtis Northwest Airplane Company has opened an office at the Curtis Hotel in Minneapolis and offers emergency service to members of the profession.

Dr. Henry P. Johnson, of Fairmont, recently visited Chicago to attend the graduating exercises of his son Donald, who had been attending a Medical college in that city.

Dr. Paul W. Aschner, of Mount Sinai Hospital, New York City, presented a paper, "The pathology of lung suppuration" at the meeting of the general staff of the Mayo Clinic.

Dr. Hubert Work, president of the American Medical Association and First Assistant Postmaster General for the past year, has been appointed Postmaster General to succeed Will Hays.

At the January meeting of the Minnesota Academy the following were elected to membership: Drs. J. Felton Hammond and Wallace H. Cole, of St. Paul, and Dr. Angus Morrison, of Minneapolis.

Dr. A. A. Zierold, a former Fellow in surgery in the Mayo Foundation, has established offices at 716 La Salle Building, Minneapolis, Minnesota, for the practice of general surgery and consultation.

Fellows will be at liberty to choose the institutions or universities in which they will work, as well as the men under whose direction they will carry on their researches, subject to the approval of the fellowship board.

Dr. Geo. Goldblum, of Minneapolis, has the distinction of having been robbed recently by a young lady in the company of a hold-up artist. Except for the loss of \$43.00 in currency the doctor escaped uninjured.

Lewisville, Watonwan County, a town on the Omaha road midway between Madelia and Fairmont with a population of 229 (1920 census), is in need of a resident physician. Communications should be addressed to the mayor.

Dr. W. A. Allen, Rochester, Minn., celebrated his 88th birthday March 6, 1922, and it is stated that he is the oldest practicing physician in the state. Dr. Allen began practice in Plainview in 1865 and moved to Rochester in 1872.

Dr. H. H. Hazen, of Washington, D. C., Professor of Dermatology at the George Washington and Georgetown Universities, gave a lecture, "The roentgen-ray treatment of superficial cancer," before the Staff of the Mayo Clinic in March.

Dr. C. H. Mayo delivered the Joyce lecture in neurologic surgery before the Academy of Medicine at Portland, Oregon, and the Jerome Cochran lecture before a meeting of the Medical Association of the State of Alabama at Birmingham.

Dr. B. D. Good, of Biwabik, has been compelled to give up practice temporarily on account of his health. Dr. Good recently suffered a severe attack of influenza which confined him to his bed for several weeks. This has necessitated a long rest.

Dr. James Farrage has disposed of his residence and practice at Winnebago City, Minn., and taken up his residence in California where he expects to make his future home. His practice has been taken over by Dr. J. L. Mills, formerly of Grand Rapids, Minn.

The City Council of Rochester, Minnesota, has voted to take over the Infant Welfare Work, which has been carried on for the last two years. All expenses will be paid by the city and the management has been placed in the hands of the City Health Department.

Dr. and Mrs. W. J. Mayo, Dr. and Mrs. D. C. Balfour, Dr. and Mrs. H. S. Plummer, Dr. Lemon, Mrs. and Mrs. Kahler and their daughter Mary who left Chicago March 4, with Dr. A. J. Ochsner and his party for a month's trip in Mexico, have returned to Rochester.

Dr. E. R. Eisler, formerly of Physicians & Surgeons Building, Minneapolis, has accepted a government position in the St. Elizabeth's Hospital at Washington, D. C. Dr. Eisler has assumed his new duties and is disposing of his office equipment in his former Minneapolis office.

Dr. James F. Lynn, of Waseca, was unanimously endorsed as a candidate for Congress at the First District Democratic convention held at Winona, March 30th. Dr. Lynn is widely known throughout the First District. He will oppose Sydney Anderson who is a candidate for re-election.

Since the principal purpose of establishing these fellowships is to increase the number of competent teachers in the field of medicine, each incumbent will be required to gain experience in teaching. As creative work is regarded as essential to the best teaching, emphasis will also be placed upon research.

The following physicians have recently been elected to membership in the Mayo Foundation Chapter of Sigma Xi, Honorary Scientific Society: Reginald Fitz, Henry F. Helmholtz, Norman M. Keith, Frederick A. Willis, J. Arthur Buchanan, W. Calvert Chaney, Linwood D. Keyser, and Albert J. Scholl, Jr.

The Western Minnesota Hospital at Graceville, Minn., has issued its annual report, of which the management has

reason to be proud. It shows a total number of 1,260 patients admitted during the year and 894 operations performed. There were ten deaths, only 1.1 per cent. The report shows the hospital to be in a flourishing position financially.

The sixth annual clinical session of the American Congress on Internal Medicine held in Rochester, April 3 to 6, was attended by about three hundred physicians and was generally considered a very satisfactory meeting. Dr. Sydney R. Miller of Baltimore, Maryland, was re-elected president, and Dr. H. S. Plummer, of Rochester, was elected first vice-president of the organization.

The Minnesota Supreme Court recently affirmed the Ramsey County District Court in a decision rendered to the effect that where a workman signs a release from benefits he is entitled to, under the Workman's Compensation Act, relying on the advice of a physician that recovery soon will be completed, and further trouble set in as a result of the original injury, he is entitled to further benefits.

To qualify for appointment as a fellow, a candidate must have the degree of doctor of medicine or doctor of philosophy from an approved university, or preparation equivalent to that represented by one of these degrees. Only citizens of the United States or Canada will ordinarily be appointed, although the fellowship board is authorized to set aside this provision in exceptional cases. The fellowships will be open to both sexes.

Virulent smallpox was recently reported in epidemic form from Missouri following closely upon the convention of the American Legion in Kansas City. The inference is that undetected smallpox was imported in unrecognized form at that time. Outbreaks of this kind mean insufficient vaccination, and continual prodding of the public, urging vaccination, is necessary in the absence of compulsory vaccination legislation.

Appointments are to be made for a period of twelve months, beginning at any time in the year, with an allowance of six weeks for vacation. The time may be extended, however, if in the judgment of the board the work which the fellow has done justifies it. The stipends are not definitely fixed in amount; but they are intended to enable the individual to live comfortably while carrying on his special work as a fellow.

The National Research Council announces the establishment of Fellowships in Medicine created for the purpose of increasing the supply of thoroughly qualified teachers in medicine in both clinical and laboratory subjects and in both curative and preventive aspects. The fellowships are supported by appropriations of the Rockefeller Foundation and the General Education Board amounting in total to one hundred thousand dollars a year for a period of five years. Those receiving awards will be known as Fellows in Medicine of the National Research Council.

About 15,000 bills and resolutions have been introduced in Congress to date. Approximately 13,000 of these were introduced in the first session. Of them, 81 House bills and resolutions were enacted into law, while 66 Senate bills and resolutions became laws. In the second session 60 House bills and resolutions have been passed and approved and 23 Senate bills and resolutions are now laws. Of this number only a half dozen or so have been concerned with public

health. These included the Maternity and Infancy Act, the Veterans' Bureau Act, the Act Supplemental to National Prohibition, continuance of the Interdepartment Social Hygiene Board, a post office cancellation stamp for the Cincinnati Health Exposition and an act providing tobacco for hospital patients.

THE UNITED STATES VETERANS' BUREAU IS:

1. Paying out over \$1,000,000 in cash every day, including Sunday, *directly* into the hands of the ex-service man or his dependents;

2. Providing, without cost, hospital care and treatment to 30,000 veterans. This care includes board and lodging and represents an expenditure by the government of \$60,000,000 per annum;

3. Giving vocational training, without cost, to over one hundred thousand disabled ex-service men at an expenditure for tuition and supervision of \$30,000,000 per annum;

4. Mailing out six hundred and fifty thousand checks every month, representing \$42,000,000;

5. Conducting an insurance business for over six hundred thousand ex-service men without any cost of administration to them. Insurance in force: Three and one-half billions;

6. Conducting over fifty thousand medical examinations every month;

7. Giving outside treatment in cases where hospitalization is not required to twenty thousand ex-service men every month;

8. Receiving one thousand new claims every day, in addition to the million two hundred thousand already on file; employing four thousand ex-service men and women in carrying out the work;

9. Requiring for 1922 expenditures in behalf of the disabled ex-service man, \$510,000,000—more than the entire expenditure of the whole United States in 1897;

10. The United States of America is already doing more for its disabled veterans than any country in the world, despite the fact that their losses were far heavier than ours.

11. Do these facts indicate that the disabled ex-service man is being neglected?

Dr. C. L. Scofield, Benson, and Dr. S. Marx White, of Minneapolis, both members of the State Board of Health, have been appointed by Governor Preus, members of the State Advisory Commission of the Minnesota Sanatorium for Consumptives. This Advisory Committee approves and supervises County Sanatoria receiving state aid. Recently resolutions were passed recommending to the Veterans Bureau the appropriation of funds sufficient for the construction of additions to the State Sanatorium at Walker.

NEW AND NON-OFFICIAL REMEDIES

During March the following articles have been accepted by the Council on Pharmacy and Chemistry for inclusion in New and Non-official Remedies:

The Intra Products Co.:

Sterile Suspension Mercury Salicylate in Cacao Butter.

Sterile Suspension Mercury Salicylate in Olive Oil.

Meadows Oil and Chemical Corp.:

Ammonium Ichthyolate-Meadows.

PROPAGANDA FOR REFORM

Another Remonstrance Against Mercury Inhalation.—During the last few years the attention of the medical profession has been directed by clever propagandists to the treatment of syphilis by procedures which involve the volatilization of mercury-containing mixtures by heat and the inhalation of the resulting volatile products. There is nothing novel in the principles concerned. Inhalations as well as fumigations of mercury have been tested at various times and the procedures have been abandoned because of the uncertain dosage. The Council on Pharmacy and Chemistry has refused to endorse preparations proposed for the treatment of syphilis which depended essentially on the administration of mercury by inhalation (Spiroicide Not Admitted to N. N. R.). In this decision it is sustained by a reinvestigation of the inhalation treatment of syphilis carried out by Cole, Gericke and Sollmann. The investigators point out that the assumption that mercury is more promptly absorbed by the lungs was based on physical misconceptions. In fact, the mercury is condensed on the mucous membranes of the mouth, pharynx and respiratory tract. That in the mouth and pharynx is, for the most part, swallowed; and the absorption then takes place by the gradual conversion of the mercury into soluble compounds. In other words, the administration of mercury compounds by inhalation has no advantage over oral administration. It has the serious disadvantage of indefinite dosage (Jour. A. M. A., March 4, 1922, p. 654).

Collosols (British Colloids, Ltd.).—Collosols is the trade name applied to certain alleged colloidal preparations of drugs made in the Crookes Laboratories by British Colloids, Ltd., London. The Collosols are recommended for external, internal, intramuscular and intravenous administration. A few years ago the Council on Pharmacy and Chemistry investigated the Collosol products and found that some of the specimens contained precipitates and thus they were not colloidal. Commenting on the presence of precipitates, the Council pointed out that if "injected intravenously as directed, death might result, making the physician morally, if not legally, liable." In the cases in which the therapeutic claims for Collosols were examined, the claims were found to be either exceedingly improbable or exaggerated. In the Collosol "literature" there are frequent references to enthusiastic reports by Sir Malcolm Morris, K.C.V.O., F.R.C.S.E. This medical knight seems to have devoted his energies to the exploitation of Collosols and is reported to be one of the directors of the Collosol concern (Jour. A. M. A., March 4, 1922, p. 674).

Hale's Epileptic Relief.—According to advertisements in certain cheap weeklies, Hale's Epileptic Relief is "prescribed by the best New York specialists." These advertisements offer to send a \$1.50 bottle free. Those who answer the advertisement receive a 4-ounce (118.4 cubic centimeter) bottle of a brown liquid and a small package of tablets, also a sample box of Hale's Liver Tablets. The American Medical Association Chemical Laboratory analyzed these preparations, and reported that the preparations give tests for ammonium, sodium, potassium and bromids, and that the bromid content is equivalent to 20.73 gm. of potassium bromid per hundred c.c. The tablets were found to contain emodin bearing (laxative) drugs—possibly aloes (Jour. A. M. A., March 4, 1922, p. 672).

Our Knowledge of Vitamins.—It is generally accepted that a well-balanced diet provides the individual with such vitamins as are necessary to maintain growth and nutrition. The British Medical Journal in a leading editorial reiterates the statement that an abundant supply of vitamins exists in all fresh vegetables and that a considerable quantity occurs in milk and meat, provided the latter substances are obtained from animals fed on fresh foods. A normal adult living on an ordinary diet containing a reasonable proportion of fresh vegetables is, therefore, certain of obtaining a plentiful supply of vitamins. Of all the mass of evidence which has accumulated relative to these substances, this fact is the point of greatest importance. It is, however, very unfortunately, the one point which those commercially inclined are unwilling to recognize (*Jour. A. M. A.*, March 11, 1922, p. 734).

Pulvane.—In a twelve-page pamphlet, sent out by the Pulvane Laboratories, Inc., Des Moines, Iowa, and purporting to deal with "The Therapy of Pulvane, an Advanced Method for the Treatment of Respiratory Diseases," we are told that Pulvane "was developed in a United States Army General Hospital by officers of the Medical Department." Pulvane is administered by inhalation, at the offices of the Pulvane Laboratories, Inc. Its "discoverer," it is declared, chanced on the method of "introducing into solution and volatilizing a certain germicide, extremely rare in its usage, because of its resistance, heretofore, to attempts to bend it to scientific will." This "rare" medicament is alpha naphthol. But since the discovery of this volatilizing method "three other ingredients of high therapeutic value have been added." It is stated that the "medical directors" will be glad to name every ingredient of Pulvane to any reputable member of the profession. Nothing is said about disclosing the amount of the ingredients of Pulvane and hence the information offered is no more complete than that furnished for such patent medicines as Peruna. With regard to the claim that Pulvane was "developed in a United States Army General Hospital by officers of the Medical Department," Surgeon-General Ireland, of the United States Army, announces that the Medical Department of the Army had nothing whatever to do with the matter and that it thoroughly disapproves of the methods of the promoters of the concern (*Jour. A. M. A.*, March 11, 1922, p. 750).

Warn's Epilepsy Treatment.—The claims made for this nostrum are similar to those made for Maghee's Epilepsy Treatment, but they are worded more cautiously. While in the case of the Maghee preparation it is claimed that certain effects WILL be produced, the Warn Remedy Co., avers that these effects SHOULD be produced by the preparation. The A. M. A. Chemical Laboratory reports that Warn's Epilepsy Treatment consists of capsules, each containing approximately 0.06 gm. (1 grain) of phenobarbital (luminal) to which has been added some charcoal and that it differs but slightly (by absence of bismuth subnitrate) from Maghee's Epilepsy Treatment analyzed previously (*Jour. A. M. A.*, March 18, 1922, p. 834).

The Future Independence and Progress of American Medicine in the Age of Chemistry.—The recent war brought about a realization of how dependent we had been on Germany for our most valuable drugs. However, before the war was over, American manufacturers were making adequate supplies of urgently needed drugs. In their work on war gases chemists had an example of what could be

accomplished in an almost incredibly short time, when facilities for research were provided on a large scale and under conditions allowing of the fullest co-operation of chemists, physicists and physicians. With the close of the war, chemists began to consider to what extent such facilities might bring about American independence in drugs. A committee appointed by the American Chemical Society has now issued a report which elucidates the subject. The report makes it clear that pharmacologic research in German universities and in privately endowed institutes are far ahead of those in the United States. Our schools of medicine and hygiene, the report continues, are largely ignoring the services which pharmacology, in close co-operation with chemists and clinicians can render to hygiene and preventive medicine. About twenty years ago, Congress established the Hygienic Laboratory of the U. S. Public Health Service; the plan of its organization was unsurpassed by that of any laboratory in the world; but since then Congress has failed to provide for any considerable growth of this laboratory. Enlarged and with adequate support, this laboratory could give the United States the leading place in the world in this great scientific and humanitarian endeavor toward the discovery of new drugs. If better government support of the Hygienic Laboratory cannot be secured, then a privately endowed research institute must be the goal of those who realize the vast benefits which will accrue from the proper type of research in drug therapy (*Jour. A. M. A.*, March 18, 1922, p. 806).

The Demand for Vitamins.—Ordinary fresh foods are the simplest, cheapest and richest sources of vitamins, yet vitamin "concentrates" are being "demanded" by the public because shrewd, forward-looking "patent medicine" exploiters are using all the subtle art of modern advertising to convince the public that it is in serious danger of vitamin starvation, and that the only hope lies in buying these alleged concentrates to make up a hypothetical deficiency. Advertising campaigns, such as these of the vitamins constitute a vicious circle; an artificial demand is created and then the manufacturer excuses his business on the ground that he is merely supplying a demand (*Jour. A. M. A.*, March 18, 1922, p. 810).

Veratrum Viride in Pneumonia.—Medical opinion is averse to the routine use of veratrum viride in the treatment of uncomplicated pneumonia. Claims made for the use of veratrum viride are advanced for other drugs, none of which have borne critical investigation. The error on the part of those who make these claims is the result of inadequate control observations. Advocates of veratrum viride, aconite and venesection believe that by the depression of the circulation produced by the treatment they may lessen the extravasation of blood into the air vesicles and to this degree lessen the involvement of the lungs. The lack of demonstrable success of venesection has led to the discarding of this once almost universally employed mode of treatment of pneumonia. It is unreasonable to expect as much or more from aconite or veratrum than from venesection (*Jour. A. M. A.*, March 18, 1922, p. 835).

Albert Abrams, A.M., M.D., LL.D., F.R.M.S.—Dr. Abrams has published a book on "Spondylotherapy" ("Physio-Therapy of the Spine"). Spondylotherapy is stated to concern itself "only with the excitation of the functional centers of the spinal cord." Between 1912 and 1914 Dr. Abrams gave "clinical courses" on "Spondyloth-

erapy" in various parts of this country. More recently Dr. Abrams had advertised that he gives a "course" in "Spondylotherapy" in San Francisco. In addition to "Spondylotherapy," Dr. Abrams has also evolved what he calls the "Electronic Reactions of Abrams" which are said to make possible long-distance diagnosis, it being necessary only to send a few drops of blood taken from the patient and allowed to dry on a slide. Dr. Abrams founded and edits "Physico-Clinical Medicine," a quarterly "devoted to the study of the Electronic Reactions of Abrams . . ." What seems to be the outstanding piece of apparatus, devised or invented by Dr. Abrams, of physioclinical diagnosis and treatment is the "Oscilloclast." All one needs to do, according to Dr. Abrams, is to ascertain the "vibration rate of a drug" and then to substitute the same vibration as produced by the "Oscilloclast." More recently, Dr. Abrams has extended his observations and experiments, using what apparently is a modification of the old-fashioned pith ball suspended by a silk thread from a rubber rod. This device he calls the "Electrobioscope." If there is any scientific foundation for the marvels that Dr. Abrams so picturesquely features, the scientific world has not yet found it out (Jour. A. M. A., March 25, 1922, p. 913).

PROCEEDINGS OF THE MINNESOTA ACADEMY OF MEDICINE

Meeting of March 8, 1922.

DR. H. L. STAPLES presiding.

DR. C. EUGENE RIGGS presented the following case:

Case of Suppressed Complex. Miss A., aged 21 years; father died of pneumonia in 48th year; mother now in 47th year and well; usual childhood infections; matured at 13 years; never strong, but no serious illnesses. Has been in two bad automobile accidents but escaped injury. Her menstruation has been very irregular, varying from three to six times a year, and since October, 1920, she has not menstruated at all. Mother and sister have shown similar irregularities. The former has been regular since the birth of her first child. In 1919, Miss A. had a most distressing experience while waiting for a car in a large city. A degenerate, finding her alone, made a most disgusting show of exhibitionism; a short time afterward she was held up at the point of a revolver and robbed. After these experiences she became very nervous and complained of rapid heart action. The nervousness steadily increased. Before the first experience she never knew what fear was. Since, especially of late, she has been unable to go to bed without looking into the closets and under the bed; indeed, she cannot sleep until she has investigated the whole house. She is troubled with "wild dreams," is always being accosted by someone, and someone is breaking into the house, and in her dreams she is always in great danger and is unable to help herself. "For the past six weeks," states her physician, "she has been in bed most of the time; she has lost weight and her hemoglobin has decreased. She also has from four to eight fainting spells daily. There is a premonition of their coming; this is followed by tachycardia; the face is pale; the finger-nails are not

cyanosed; the attacks have steadily increased in severity and the patient has gradually become weaker."

The neurological examination was negative; the metabolic rate was plus 11.8 per cent; hemoglobin, 86 per cent; r. b. c., 4,640,000; w. b. c., 7,300; number of cells counted, 200; p. m. n., 60 per cent; lymph, 35 per cent; large monos., 3 per cent; trans., 1 per cent; eosin, 1 per cent; urine, normal.

Dr. Rothrock, who examined the pelvic organs, reported as follows: "I have examined Miss A. and find the uterus normally developed, in good position, freely movable. The right ovary can be felt slightly prolapsed but apparently free from adhesions, and of normal size. Ovary on the left side can be felt; could not be palpated. So far as the pelvic organs are concerned, there is nothing abnormal to be discovered, so that it is probable that her amenorrhea is functional and is probably dependent upon some disturbance of the balance of the internal sections. It would appear that this is but one of the symptoms of the clinical syndrome."

Observation made in clear that the "fainting" attacks were neither of epileptic nor of hysterical character, but were dependent upon the psychic insult she received in the first experience referred to. This she kept to herself and has never mentioned to anyone until she related the experience to me. Evidently this distressing complex was the cause of her nervous symptoms and offered a satisfactory explanation of her illness. The endocrine factor is an epiphenomenon; its familial character is most interesting and undoubtedly had been influenced by the stress and strain through which she has passed. Immediately after I explained to her the psychology of her trouble the attacks ceased; her stay at the hospital was short. At present she is in excellent health and enjoying her work.

This is an instance where one must consider, as Patrick says, "the patient above the eyebrows." During the earlier interviews she made no reference to her distressing experience. She stated that life had been uneventful—that of a happy, care-free young woman. The complex was suppressed, not dissociated. Disorders of personality usually arise in either of two ways:

(a) Inability of patient to adjust himself to his environment.

(b) The effect of the complex suppressed or disordered on the subconscious.

Shell-shock and the neuroses of civil life illustrate the former, while this case is an excellent example of the latter. The existence of conserved experiences outside the domain of personal consciousness—the subconscious—a purely philosophical concept, was first postulated by Kant and Hartmann. These experiences not in awareness with personal consciousness were not supposed to bear any relation to life or conduct. Later it was demonstrated by Janet of France and Gurney of England "that dissociation with the formation of subconscious processes motivated by their own emotional impulsive force take on autonomous action and induce physiologic and psychologic phenomena" (Prince); and to these subconscious processes rather than personal consciousness personality is believed to be due. They shape our beliefs, our ideals, our character. From them arise the bizarre delusions and hallucinations of the insane; the syndromes of hysteria, psychasthenia and the

various complexes incident to abnormal psychology. Search for the determinants—the complexes—is a grievous and time-consuming process, but amply repays the effort. In our investigation of functional causes and mechanisms we must not forget that Neurology consists of much more than aberrations of personality. Differing radically as we do as to the factors, mechanisms and process which give rise to the psychotic individual, yet we must all agree that the explanations of the latter can only be found in the conflicts, impulses and reactions of human personality. (Prince.) I certainly believe in the theory of the subconscious; as a working hypothesis it augurs well; mental conflicts and repression are dynamic factors, everywhere in evidence. Frank suggestion without careful investigation of the psychic factors at play, as in Christian Science, faith cure, osteopathy, etc., sometimes results in recovery, and to this and the indifference of medical men to functional nervous diseases is the popularity of the cults due. In dealing with human credulity and the urge of the mystic which we find in our patients—their fads, their eccentricities, their fancies—we must not forget that skilful psychological handling is the crux of the whole matter. May I recall to you the legend of Greek Mythology—that the Titans, children of Earth and Heaven, warred with the gods and were cast bound into the Gulf of Tartarus where, lying prostrate, they became restive and shook their bonds and doing so caused the earth to tremble. When the earth trembles, remember the Titans.

Dr. E. L. TUOHY, of Duluth, presented the following cases:

Three cases of "Mesenteric Embolism with Resultant Thrombosis of Mesenteric and Intestinal Arteries, Associated with Myocardial Disease."

I wish to report and place on record three instances of this pathological sequence in cases observed for some time suffering from myocardial insufficiency or degeneration.

Gerhardt in 1863, and Kussmaul in 1864, first drew attention to the clinical findings associated with this phenomenon. Much experimental work done by Welch, Mall, and others, gives the degree of interference that the main branches of the superior mesenteric artery will tolerate without bowel gangrene. The inferior mesenteric artery seems not to be affected as does the superior, which supplies all of the small bowel except the upper third of the duodenum and one-half of the lower bowel. The superior mesenteric comes off at a relatively high level, closely associated with the celiac axis, and is an artery of relatively large size, no doubt predisposing it to the collection of emboli. Like the coronary, gradual occlusion, if occurring slowly enough, may give time for compensatory relief. But it is generally agreed that rapid complete occlusion of this artery or any of its chief branches is always followed by hemorrhagic infarction of a lesser or greater segment of the intestine.

The chief clinical signs are the manifest evidence of intestinal obstruction, the passage of stool material (if at all) blood tinged, and the usual vomiting of fecal material, often bloody. Unless surgical relief can be promptly available, death is certain. The surgical mortality, when mentioned at all, is said to be as high as 92 per cent; only one-sixth of the cases is said to be feasible from the standpoint of resection. The outlook is made doubly bad,

not only on account of the infectious and toxic phenomena incident to any bowel obstruction, but also on account of the very severe cardiac condition usually precipitating this abdominal catastrophe.

CASE 1. Male. C. D. Age 37. Weight about 220 pounds. Was under care for auricular fibrillation and myocardial insufficiency with general anasarca. He had in the beginning, severe dyspnea, cough, with râles at the bases of both lungs, and was thoroughly uncomfortable. There was in the beginning, before any digitalization, a pulse deficit of 70. After about four weeks' observation and rest he became quite comfortable and was up and about. Then suddenly he had a very severe abdominal colic, with the vomiting of fecal material, latter becoming bloody. Enemas brought down some scanty material that was blood-stained and contained mucus. He passed rapidly into a very critical condition.

Under a local anesthetic the abdomen was opened, where 10 to 12 inches of black, gangrenous small bowel was found. The bowel was greatly dilated. The mesentery was also gangrenous. Tubes were passed into the bowel each way, after sewing it to the belly wall. Patient succumbed within a few hours—about twelve hours after the beginning of his attack.

CASE 2. Male. N. J. Age 63. Was under observation for myocardial degeneration. He showed occasional short periods of distinct splitting of the first tone of the heart (suggesting branch bundle block). He had a curious interlobular hydrothorax. He showed only a moderate improvement under rest and general supportive treatment. Suddenly, about two months after he was first observed, he developed a severe abdominal colic, vomiting the same kind of bloody material as was found in the first patient. He developed later a persistent hiccough, and passed rapidly into collapse, and died within sixteen hours of the development of his intestinal symptoms.

CASE 3. Female. Age 65. Originally suffering from obesity and essential hypertension, had been under observation for a period of six years. Gradually, with the evidence of a failure of her myocardium, she developed mental aberrations, but the kidney function, frequently observed, remained well sustained. While the possibility of sending her to a sanitarium for nervous cases was being considered, on account of her mental state, and while she was entirely free from any bowel discomfort, she also developed the same sudden, excruciating abdominal pain, and vomited bloody fecal material. Persistent effort with enemas from below gave no relief whatever. She died within five hours after the onset of her abdominal pain; in fact, while being moved into the operating room for an attempted operative regime.

COMMENT: It will be seen that all these cases passed into collapse and died extraordinarily promptly. While only one abdomen was opened, and thus confirmation of the diagnosis made available, there is no good reason to doubt the authenticity of the other two cases. It has been sometimes stated that during digitalization of failing hearts, emboli and infarction are possible, and sometimes imminent, dangers. One of these cases had evidences of heart block, and digitalis was not relied upon at all; only in one case had digitalis been used to the point of securing its effect. In that patient the mesenteric embolus occurred at a time when he had been restored to fair compensation,

and we would not have in mind the possibility of whipping up and distributing the clots that had accumulated during the period of his high pulse deficit. I feel that this condition must occur oftener than the literature would lead us to suspect. It is quite possible that this condition sometimes masquerades under the diagnosis of an ordinary intestinal obstruction, or, more rarely, might be misinterpreted as an uremic evidence in patients with failing hearts who are rather prone to show albumin in the urine.

In addition to these cases I would like to present a case and show one slide in connection with a curious disease, and would like to ask if any of the members present have seen anything like it. It is a case of Milroy's disease.



Milroy's disease, Meige's disease, or hereditary tropho-edema, was first described in this country by Milroy in 1892, and later by Meige of Paris in 1899. Case reports of this rare condition have been few, the most noteworthy contribution being that of Hope and French in 1908 in the *Quarterly Journal of Medicine*.

The condition belongs to the tropho-neuroses, affecting the vaso-permeability, and therefore may be allied to angioneurotic edema and the acute circumscribed edema of Quincke. The condition is frequently found in association with other neuroses such as urticaria, intermittent hydrarthrosis and angioneurotic edema. It is essentially chronic, begins congenitally or in early life, and has little tendency to shorten life, one patient living to the age of 83. The edema is chronic, affecting the extremities usually unilaterally at first, and sometimes eventually becoming bilateral. It is more common in the lower extremities and, in its development, characterized by the fact that it begins usually about the ankle without any dependent edema in the foot. After a varying period of time the edema seems

to ascend rapidly to the knee, and again later on to the hip, beyond which point it does not go. The edematous limb is generally pale, but may be cyanotic or hyperemic. There is pitting on pressure, but the consistency is much firmer than in ordinary edema. Usually a mild state of elephantiasis is reached. The familial tendency is characteristic, and without it the diagnosis is questionable. In the cases reported by Hope and French, eight were afflicted in a single family. Another striking characteristic found in the condition is periodic attacks of fever, accompanied by vomiting, diarrhea, epigastric distress, and a marked hyperemia of the affected limb simulating erysipelas. These attacks may occur quite frequently and suggest the paroxysmal seizures of Quincke and Raynaud's disease, but similar seizures occur in filarial elephantiasis, so it is not characteristic of a tropho-neurotic condition. Unless the following criteria are fulfilled, the diagnosis of Milroy's disease should not be made:

(a) The absence of all recognized causes of edema outside the nervous system.

(b) Its extreme chronicity, the affection dating sometimes from birth and lasting for the remainder of life at whatever period it starts.

(c) The sharply-defined boundary of the swelling and the tendency to affect segments of limbs rather than to follow the law of gravity as in ordinary edema. For example, the leg may be grossly diseased and the foot almost normal.

(d) The tendency to produce a hyperplasia of the skin and subcutaneous tissues of the part affected.

(e) The familial and hereditary character of the complaint, and its association either in the affected individual or in other members of the family with other neuroses.

The case I wish to present is Mrs. W. R., Canadian born, aged 50, married, and by occupation a housewife.

The patient has had no children, and had one miscarriage.

Family History: Father died of pneumonia. Mother died of heart disease, and had from about the time of puberty the same condition in her leg which this patient presents. Several brothers and sisters are living and well. One sister died of some obscure lung disease. One cousin similarly has the same condition as the patient's mother and the patient herself.

Menses: Patient's menstruation ceased at the age of 45, uneventfully, and without any recurrence since that time.

Past History: Patient has always been well, with the exception of the presenting condition, and for the fact that in 1920 she on two occasions had fever with vomiting, gastric distress which lasted several days, with severe chills, and accompanied by a marked redness of the legs.

Present Complaint: Patient now complains of marked swelling of the left leg from the groin to the ankle, slowly progressive, beginning at the age of 18, before she was married, without any antecedent history of infection, and gradually progressing from the ankle upward to the groin. The condition has been unaccompanied by pain, but in the past year the patient has noticed a similar tendency to swelling about the right ankle. At one time a superficial wound of the left leg resulted in the transudation of serum for about two weeks, but benign healing soon followed. Patient's general symptoms were negative.

Physical Findings: On examination the following data were elicited: Temperature, 97; hemoglobin, 80; red blood count, 3,750,000; white blood count, 8,000. Catheterized urine negative (chemically and microscopically). The patient had a distinct pallor, suggesting the anemic condition, verified by the blood picture. Examination of the head and neck was negative, with the exception of mildly infected tonsils. Examination of the chest, including the heart and lungs, was negative. Examination of abdomen negative. Pelvic examination showed a small uterus, without fixation and any evidence of deformity in the adnexa. The upper extremities were normal. The left leg showed a rather uniform, pale swelling, from the ankle to the groin, not involving the foot appreciably, which did not pit very easily on pressure and seemed to be hard in consistency. Examination of the other leg showed only a beginning edema about the ankle and slightly above that point.

Diagnosis is based on the fulfillment of the criteria outlined by Turney:

1. The absence of any cause for the edema outside the nervous system.
2. The chronicity.
3. The sharply-defined boundary, with the absence of edema in the foot.
4. The hyperplastic skin and subcutaneous tissue.
5. The familial and hereditary tendency.
6. The exacerbations of fever, redness, chills, and epigastric distress.

Discussion by

DR. A. W. ABBOTT: About 15 years ago I had one of these cases and did not know what it was. Did not know, in fact, until just now. I remember the case very well and it answered the description of Dr. Tuohy's case perfectly. The disease was confined to the space below the knee and above the ankle. There was no other case in the family. I suppose it has to begin with some member of a family. This boy, who was about 10 years of age, might have been the beginning of a series.

DR. PAUL COOK: We had a boy here during the summer who was 8 or 10 years of age. I think he finally went to the University Hospital. His case was really not a skin condition. His history only went back to an uncle who had the same condition.

DR. S. M. WHITE: Dr. Tuohy speaks about the lack of involvement of the foot, but in this boy of which Dr. Cook speaks the dorsum of the foot on both sides was involved. The parents were free, but an uncle of the boy had the same condition.

An adult case seen about three years ago also had involvement of both legs, but only on one side was there involvement of the foot. That case, on investigation, proved to have an ancestry in which the disease had occurred in at least three generations. In one of those cases it was a decidedly deforming condition. There was an edema about like that in the case given by Dr. Tuohy.

DR. TUOHY: Was there a history of abdominal cramps?

DR. WHITE: In neither of these cases was there a history of abdominal symptoms.

DR. A. C. STRACHAUER: Milroy's disease of the lower extremity without involvement of the foot is, of course, easily diagnosed, but when the foot is involved how would the condition be differentiated from elephantiasis? I am

not referring to Dr. Tuohy's cases, but to the cases cited in the discussion. I fail to see how the differentiation could be made unless there be a familial history and co-existing abdominal symptoms. In elephantiasis of the lower extremity the foot is, of course, always involved, and while pachydermia and skin folds are present in the advanced cases the skin in the early condition may be quite smooth and normal, particularly in the cases of elephantiasis caused by a previous erysipeloid infection, which latter type constitutes the majority of cases seen in this country, the filarial type being most rare.

Regarding the subject of mesenteric thrombosis, as presented by Dr. Tuohy, my personal experience is limited to two cases. The suddenness and severity of the onset of symptoms are similar to those of acute hemorrhagic pancreatitis. It is very evident that a calamity has occurred and it is unwise to waste valuable time in endeavoring to make too refined a diagnosis. The diagnosis of acute surgical abdomen suffices, and the patient should be operated upon as promptly and with as great dispatch as possible. In one case twelve feet of jejunum and ileum were resected and end-to-side anastomosis of the terminal ileum to the anterior wall of the stomach was made. The vitality of the duodenal-jejunal site of resection was so impaired that it had to be closed as a blind end. The patient did very well for three days and then died.

We are carrying on some animal work at the University to ascertain whether the operation of closing the end of the duodenum with a gastrointestinal anastomosis is a feasible one.

In the second case a foot and a half of bowel was resected, and the patient lived for five days.

Surgical treatment is the only possible hope for these cases and must be promptly applied to be of benefit.

DR. COOK: My recollection of Milroy's disease is that it is congenital.

DR. TUOHY: According to the literature this is not true. In this case it did not develop until the patient was 18. It is regarded as a syndrome. The literature pointed out that there was a difference so far as the paroxysmal seizures are concerned. Elephantiasis had to be ruled out on the secondary signs of the disease rather on the appearance of the leg.

DR. E. S. GEIST: Within the last 10 days I have had a case similar to the one Dr. Abbott speaks of—no swelling of the foot, and swelling of the leg between the ankle and the knee. The patient was a woman 35 years of age and the condition followed some infectious disease some 15 years previous. I think it was scarlet fever. It was unilateral, the skin smooth, and there was an edema which was permanent and not relieved by rest in bed. I should like to ask Dr. Tuohy what the literature says about the possible infectious origin of this condition.

DR. TUOHY: The literature leaves the cause of the disease indefinite. Purpuric cases will pass blood in the urine. These pains are due to intestinal cramp due to swelling in the intestine itself. There may be a cause similar to that of angioneurotic edema. Evidently infection is not the chief causation. Food idiosyncrasy or poisoning might be a causative factor. While the literature mentions the fact that the disease may be congenital, it also states that it may come on any time.

Regarding operation for the bowel condition incident to

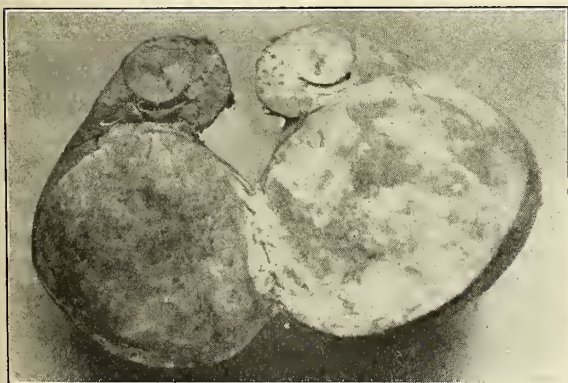
thrombosis of the superior mesentery, I would say that if we were to look out for it in heart disease cases something might be done, but it comes on so very suddenly that one must act quickly.

DR. R. E. FARR: Elephantiasis is not always caused by filariasis. Handley has reported a number of instances in which the staphylococcus albus was cultured in subcutaneous fat. I believe that elephantiasis need not be confused with this disease for it becomes more or less permanent when established and we do not have remissions.

DR. ARCHIBALD MACLAREN reported a case of kidney tumor in a child.

On February 27, Dr. Ramsey, of St. Paul, referred to me a small boy, 18 months old. He had a large smooth elastic tumor in the upper right hypochondriac region. This tumor was first noticed in December, 1921. It was pronounced at once as inoperable and hopeless and was taken to Dr. Owre for x-ray and radium. Dr. Owre gave four radium treatments consisting of 5,400 milligram hours with a one-inch gauze pad between the radium and the skin. The last treatment had been given two weeks before we saw the child. The tumor had steadily increased in size in spite of the radiation. There was no discoloration of the skin over the tumor. The child had gained three pounds in weight in the past two months and looked the picture of health, excepting for the steadily increasing tumor. There had been no other physical findings except blood in the urine, which had been noted on two different occasions. The first time there was considerable blood one day three months ago. The second bleeding was very slight, the urine being markedly pink in color for one day three weeks ago. Aside from the symptoms noted the child was normal in every way.

Because there was some question regarding the advisability of any operation, Dr. A. Schwyzer was asked to see the patient with us. He advised the wisdom of an exploration to determine the character of the tumor.



After removal the tumor mass was sent to Dr. Margaret Warwick, who gave the following pathological report:

"Kidney and tumor mass: A large tumor mass measures 4x4x4 inches. It is entirely encapsulated but the capsule shades imperceptibly into the capsule of the kidney. No adrenal was found. The kidney itself measures 2x2.5 inches. Throughout the cortex are numerous small cysts which measure from 1 to 3 mm. in diameter. In the center of the cortex is a tumor mass similar to the larger one

described above only it is much smaller, measuring 1x1 inch. This projects down into the pelvis of the kidney, but is not connected with the mucosa of the pelvis. The pelvis itself is moderately enlarged and somewhat distorted by the pressure of the larger tumor mass, but otherwise appears normal. The upper pole of the kidney is markedly elongated and fades into the capsule of the larger tumor mass.

"Gross section of these tumor masses shows them to consist of very soft homogenous pink tissue. Microscopic section shows identical structure in both tumors. It consists of various tissue elements. Groups of spindle cells predominate and these show many mitotic figures. In these masses of spindle cells are numerous atypical tubules lined by poorly differentiated epithelial cells showing many mitotic figures. These tubules, however, have definite lumina. There are also areas showing the stellate cells typical of myxomatous tissue. In still other areas there are bundles of smooth muscle tissue. So this must be classified as a mixed or embryonal tumor of the kidney. From the histological picture alone it appears to be of a very malignant type, but the behavior of these tumors cannot be foretold by their cellular appearance, for many do not metastasize, while others, less malignant in appearance, do metastasize.

"Diagnosis: Embryonal adenomyosarcoma (malignant mixed tumor) of kidney."

Discussion by

DR. A. SCHWYZER: I saw the case before operation and the most striking feature was the large size of the tumor in a little baby 18 months old. The child looked remarkably healthy, playful and well. Another interesting feature was that the tumor was absolutely smooth. It was a condition which would invite surgery and gives us a chance to get a clean removal.

DR. A. T. MANN: These tumors of the kidney are very interesting. Pathologists have a good deal of difficulty in uniting as to just what they are. But the point I arise for is the question of radium. As I understand it, radium is really most effective within a distance of one inch and beyond that distance its rays penetrate rather sparsely and while they may go to a considerable distance there is not very much power to them. Also the dosage would vary with the intensity of that ray. With an application of radium to such a deep tumor the portions near the radium would receive a degenerative dose and the cells would be destroyed; in the next zone beyond this the cells would receive a sterilizing dose and while they would be able to live they would lose their power to reproduce; and in the zone beyond this the cells would receive a stimulating dose, making them grow more rapidly. It strikes me that this is not a proper case to use radium on. In the first place a small amount of radium is a stimulating dose, i.e., stimulates the cells to grow. A larger dose is a sterilizing dose. Where radium is used for a longer time it helps the tumor to degenerate, but in tumors of this kind I believe it should not be used.

DR. H. B. SWEETSER: I ask about the pathology of this. Pathology seems to bear out that this is a mixed tumor of children. About four years ago I took one out of a child 8 years old. I was astonished to find how easily it came out. The child was out in a short time. I gave the tumor to Dr. Bell, who pronounced it a mixed tumor of children

and said that the child would not live over eighteen months. This child lived over a year and died in about fifteen months, I think. Some man in New York reported that all of his cases were in young children. One young lady lived for three or four years. I have not seen tumors like that in children who did not die. The prognosis is almost absolutely fatal.

DR. MACLAREN: It seems to me that when we have a case like this we are justified in operating if for no other reason than that we may determine the absolute character of the growth. Suppose we could not entirely remove the growth. Then the proper thing to do would be to put the radium right into the tumor. Dr. Ramsey says he has one case still well after three years. But even if we can give them only one or two years, I think that that is worth while, for all that we are doing as physicians and surgeons is to prolong life a short time.

DR. A. W. ABBOTT reported a case of pregnancy without a corpus luteum.

Mrs. G., first seen January 17, 1922. Age, 27 years. One child 8 months old. Menses began in July after confinement. Menstruated regularly to November 18. Then flowed profusely; no pain. December 15, slight flow followed by yellow discharge with some odor for four days. No flow in January, but pain and tenderness in right pelvis. Sharp pains at intervals; no violent pains. Other general conditions normal except hemoglobin 58 per cent. Uterus in normal position, large. Soft cervix. Indefinite tender mass in right pelvis. At this time the diagnosis was possible unruptured ectopic pregnancy. January 20, swelling and tenderness slightly less. January 28, swelling increased with great tenderness, pains continuing. January 29, a median exploratory incision made. In the right pelvis was an impacted ovarian cyst, thick-walled and containing a slightly tinged content. Left ovary was decidedly smaller than normal, either atrophic or never fully developed. No corpus luteum could be found in either ovary after most careful examination. Microscopic examination of the ovary shows the usual decadent corpora lutea of menstruation. The cyst wall shows no evidence that the cyst was ever a corpus luteum. Uterus was the size of a two months' pregnancy. February 9 and March 1 the patient was re-examined. Uterus still increasing in size with every indication of pregnancy.

This case is presented with the specimen of the right ovary removed at the operation because it is taught that in pregnancy the corpus luteum peculiar to that period is always manifest. In this case there is either a mistake in the diagnosis of pregnancy or else this must be a rare exception to the rule. If this proves to be a normal pregnancy, the absence of the corpus luteum of pregnancy cannot be positively depended on as a deciding factor in differentiating a soft uterine tumor from a pregnancy.

DR. W. H. MAGIE, of Duluth, read a thesis entitled, "Some Experiences with Fractures," and gave a lantern slide demonstration.

Discussions by:

DR. H. J. O'BRIEN: Dr. Magie's paper is most interesting. I was glad to hear the Doctor say that he sometimes uses Lanc plates in bone surgery. Nothing has been more abused, both in literature and practice, than the Lane plate and yet in properly selected cases, in competent hands, it

is one of the most reliable methods of obtaining a union of broken bones.

I was glad to hear Dr. Magie say he does all his work in the Morgan Park Hospital because that releases him from any responsibility of a patient who came in our office today with an injured hand, which had been diagnosed in Duluth in the last ten days as a sprain of the hand. Carrying out the same method that Dr. Magie uses in the Morgan Park Hospital, an x-ray of the hand showed a double closed fracture of the fourth metacarpal bone. Had this patient consulted Dr. Magie he would have had an x-ray examination and the proper diagnosis would have been made.

I haven't had anything like the success Dr. Magie reports in fracture of the spine. In fact, I have had no success at all. Some years ago I developed an enthusiasm for operation on fractured spines and after seven consecutive failures (so far as relief of the patient was concerned) I desisted, thinking I would never operate upon another fractured spine accompanied with immediate paraplegia. Some months after this resolve, I saw a case of fractured spine with immediate paraplegia, in consultation with Dr. Sneve, and it seemed to me a favorable case with some promise of relief if operated upon. So I changed my mind and did a laminectomy, but with only the same results I had obtained in the seven previous cases. I do not think I prolonged any of those patients' lives and am quite sure I made them more uncomfortable because of the increased discomfort of being moved about in the bed for dressings, etc.

I have seen two fracture dislocations of the spine, without pressure on the cord, recover; but I have never seen a fracture of the spine, followed by immediate paraplegia, recover or improve. But a fracture, or even a fracture dislocation of the spine without severance of the cord fibres by spiculæ and a comparatively slow oncoming of paraplegia from hemorrhagic pressure, may require operation for relief of this pressure and recover.

DR. E. S. GEIST: We must thank Dr. Magie for bringing us these *usual* cases. I want to congratulate him on the excellent results he obtained in these cases. The field is a very large one and I simply want to emphasize the use of the x-ray in fractures. We still find too many fractures neglected in that way; not x-rayed or not x-rayed enough. The x-rays are not taken at different angles, and the result is that some fractures are often overlooked. In court the value of the x-ray as evidence is very great. I have recently had the unfortunate task of assisting several doctors in malpractice suits. If physicians who have serious fracture cases (and almost all are serious) would call some other physicians in consultation, such lawsuits would not be as frequent.

I wish to speak about only one form of fracture this evening and this is the fracture of the small bones of the foot. I have seen many cases of metatarsal fractures caused by trivial accidents, mis-steps, etc. The importance in correct diagnosis is that these patients should be put at rest. The foot can be walked upon, but excessive walking during the period of healing causes excessive callus formation and this is often followed by a permanently painful foot. The main point is simply to recognize these fractures, and this is most easily done by the x-ray.

DR. A. MACLAREN: We can get a great deal of information from people who have the kind of experience that

Dr. Magie has had; men who have been able to follow their patients to know what the final results are; and they are the people who are best able to tell us when we ought to operate and when not. There have been a great many useless operations in the past few years. That craze is passing now. Occasionally, it is necessary to operate, but the Lane plates can, and usually should, be taken out if they commence to give trouble.

DR. A. T. MANN: I certainly have had a great deal of pleasure in listening to this long line of experience, and to one who can get such results. There is one thing I would like to call your attention to that may help in these cases, and that is the use of the carpenter's mallet. Afterwards, it is put up in the Whitman plaster spica. It simply adds an impaction which we know stimulates callus formation.

But there are a good many other uses for it than that. One of my early cases was a fracture of the astragalus. Under full anesthesia and exerting my full strength I was unable to replace the fracture. Finally we sent for a carpenter's mallet and it was a very simple thing to do it then with a few blows of the mallet. In a Pott's fracture, where the joint has spread a good deal and you are not able to get a good position for the malleolus, turn the leg on the side and with a soft pad of gauze over the malleolus. With a mallet the malleolus may be molded into place easily, almost as though it were putty. One doesn't need to use much force. The only thing about it is that you may get a little too snug instead of a loose joint. That has happened in only one of my cases, but nature is very kind and the bone and cartilage are absorbed backwards and the joint was finally made all right.

Dr. Cotton, of Boston, first used the carpenter's mallet in cases of intracapsular fracture at the hip to induce an impaction in addition to the proper Whitman position and so add one important factor in the healing.

DR. E. T. FARR: I enjoyed Dr. Magie's paper very much. He is somewhat contradictory in his statements. In the first place he always objects to the use of authorities, but he must know that in this instance at least he must be considered one. Second, he criticizes the younger men for using the Lane plate with too much frequency, and I must say this is the first time I have ever heard him admit that he was not one of the younger men like the rest of us. I know of no papers we have had in recent years that have been more instructive than the papers of Dr. Magie and Dr. More, and I regret that their teaching is not more closely followed by the men who treat an occasional fracture. There is still too much of a craze for operating and men do not obtain the results they should by the use of the closed methods. I recently treated a girl ten years old for a fracture of the femur. During my absence from the hospital another surgeon took charge of the case and had made arrangements to take the girl to the operating room. Just at that time the case changed hands once more. We put the girl in Buck's extension and the result is so perfect that it is practically impossible to tell which leg had been broken.

The doctor mentioned the method of Steinman. I believe priority in the use of pin through the heel belongs to Anschütz. In the cases in which I have used it, that is cases of fracture just above the ankle joint, I have not

had any trouble. I believe it is one of the open methods that may be used very safely.

DR. G. SCHWYZER: I would like to have Dr. Magie make a remark on impacted fractures. The diagnosis is not easily made. I recall two cases. One a woman who made a misstep in getting off a street-car. The physician made very accurate measurements and we could not find any swelling. Dr. Geist made an x-ray and it showed an impacted fracture.

I have a case at present in the hospital—a boy who was thrown from a truck going around a corner. He got up and walked. After a while the leg pained him so much he had to give up walking. X-ray pictures were made but even with these it was very hard to recognize the line of break. Clinically, though, we feel that the large trochanter is dislocated upward about half an inch.

The treatment of fracture varies very much. I just recall a case of a man of 64 years with a fracture of the thigh about a hand's breadth below the joint. We put him at once in a plaster-of-paris cast. Deep anesthesia was necessary. Traction on the leg downward and on the pelvis upward was established until the cast was completed. When the plaster-of-paris was hardened the old man was put on his feet on crutches. The fracture was solidly healed when the cast was removed six weeks later. Such treatment of fracture may still be justified at the present time, but it is not considered good practice an account of other reasons.

DR. MAGIE (in closing): In this series we show only a few of the fractures we have had in the last five years. My experience in the treatment of fractures was much greater than this. The reason we have shown no impacted fractures here is that we have not had one recently. I remember the days when we often overlooked them until the leg got short; then we came to the conclusion that we had had an impacted fracture. Nowadays there is no reason why we can't diagnose impacted fracture.

What I wanted to lay particular stress on in this paper was the injuries to the small bones of the foot. They are so common and so unsuspected. In any sprain of any kind, take an x-ray picture and you will be surprised to find how many of them have fractures. In doing this you will be able to give them the proper kind of treatment.

HARRY P. RITCHIE,
Secretary.

PROGRESS

Abstracts to be submitted to Section Supervisors.

MEDICINE

SUPERVISORS:

F. J. HIRSCHBOECK,
FIDELITY BLDG., DULUTH
THOMAS A. PEPPARD,
LA SALLE BLDG., MINNEAPOLIS

SOME THEORETICAL AND SOME PRACTICAL ASPECTS OF PSYCHANALYSIS: Charles K. Mills, Emeritus Professor of Neurology, University of Pennsylvania, Consulting Neurologist to the Philadelphia General

Hospital. (Arch. of Neur. and Psych., December, 1921.) The teachings of Freud have made variable impressions on the medical world. While many physicians have taken the "I'm from Missouri" attitude, a certain number of them have become very enthusiastic followers of Freud. Others have, on the other hand, developed a violent dislike to psychoanalysis. Charlatanism has frequently thrived because of it. Magazines occasionally devote column after column, expounding its theories in a very impressionistic style to unsuspecting or curious readers. It must be admitted, however, by the impartial observer, that the endeavors of the astute and unusually keen Austrian physician have profoundly influenced present day psychology and psychiatry. Mental symptoms are now being studied more from the interpretative standpoint rather than the merely descriptive. The so-called behavioristic psychology has received its impetus. We are not content to merely give our attention separately to intellect, emotion, etc., but we endeavor to see in conduct the particular type reaction to all factors influencing it.

Mills quotes psychoanalytic writers frankly, accusing others of mystic tendencies, or defending themselves against such accusations. He deprecates particularly the freudian sexual symbolism and speaks of their references to legends and painting as indicating only "how they read their own ideas into these." He criticises the varied interpretations given to the word unconscious, yet does not tell us how he himself would define it. The Oedipus and Electra complex are prominently scathed. "Dreams," he avers, "reflect currents of alert consciousness; sex and hunger play a secondary part in the behavior of mankind in general." The method of psychoanalysis is shown to have played but a minor part in the development of war neuroses, while fatigues and the instinct of self-preservation were more important. A profounder study of sex resulting from psychoanalysis he regards as beneficial. Concentration on its mystic aspects is harmful, just as is the case with other allied cults. Finally, he gives it as his opinion that psychoanalysis is now tending toward the discard.

J. C. MICHAEL.

THE DETERMINATION OF CLINICAL ACTIVITY IN PULMONARY TUBERCULOSIS FROM ROENTGENOGRAMS: (Preliminary Study.) Ornstein and Sampson. (Am. Rev. of Tuberculosis, December, 1921, p. 842.) Criteria of activity at present are largely clinical. A minimal lesion may at times give a greater symptom complex than a more advanced case. This is usually attributed to differences of virulence or resistance. The degree of toxemia produced by a lesion depends upon circulation. The amount of toxemia depends upon the extent of the lesion which the circulation drains. Interpretation of shadows in roentgenograms should always be associated with the pathological process which may account for such shadows.

Study based on 100 cases. Stereoroentgenograms diagnosed as active, retrogressive and healed, independently of any other information. Opinions agreed with clinical findings in 87 per cent. Five cases called active by clinician diagnosed as inactive by x-ray. Out of 74 cases diagnosed clinically as inactive eight were called active by x-ray.

Activity is indicated in roentgenogram by

1. Mottling with ill defined margins.

2. Presence of spontaneous and localized pneumothoraces.

Diminished activity runs parallel to the amount of fibrous and calcification that has taken place.

T. A. PEPPARD.

THE UREA CONCENTRATION TEST FOR KIDNEY FUNCTION. Edward Weiss (The Med. Clin. of North America, November, 1921) discusses the diagnosis of kidney disease from the standpoint of determining kidney function. He evaluates some of the more accurate methods, as (1) the phenolsulphonephthalein test, (2) the determination of degree of retention in the blood of various metabolic product, such as urea, non-protein nitrogen, creatinin, and uric acid, (3) "two hour" or Mosenthal test, (4) Ambard's coefficient or McLean's index. He shows that the P. S. P. test and the determination of the degree of nitrogen retention do not show the early involvement in chronic nephritis, that the "two hour" test is so delicate that its interpretation is often difficult and sometimes inaccurate, and that the methods of Ambard and McLean are too technical.

He points out that urea possesses certain advantages as test substance for renal function, which he outlines as follows: "(1) It is a true and product of protein metabolism and is incapable of further alteration within the body. (2) It is a normal excretory product. (3) It is excreted practically only by the kidney. (4) It may be given in large doses and is readily absorbed and taken up equally by all the tissues and fluids without producing any ill effects. (5) The administration of a large dose of urea throws a strain upon the kidneys. This appears to be its greatest advantage as a test substance for renal function."

He gives the technique of the urea concentration test and the interpretation of the same. Several tables are shown, comparing the "Urea Concentration Test" with other functional methods of estimating renal function in the various types of nephritis and in cardio-vascular renal disease. Its value in prognosis is also shown.

He concludes as follows: "The urea concentration test appears to be a simple and fairly reliable method of determining the efficiency of the kidney, but, notwithstanding certain theoretic advantages which it possesses over other methods, practically it is not ideal, and should, therefore, be considered a useful adjunct to be employed in conjunction with other methods, the whole being weighed with the clinical data in an evaluation of a case of renal disease."

P. G. BOMAN.

SURGERY

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MAYO CLINIC, ROCHESTER

A SAFE METHOD OF REMOVING SIGMOIDAL POLYPS AND HIGH RECTAL POLYPS: L. A. Buie. (Southern Minnesota Medical Association, December 5,

1921.) The author describes an instrument which can be operated through the proctoscope for the successful removal of polyps from the sigmoid and rectum. The instrument, which is about 35 cm. in length, is composed of two crushing jaws operated by screw appliances on the end of a narrow tubular shaft. The patient, after thorough cleansing of the rectum, is placed in the knee-chest posture, the proctoscope inserted and the polyp located. The clamp is then passed in with the jaws open and, with the aid of a special hook and fork, the pedicle of the polyp is drawn into the jaws of the clamp. By turning the screws on the end of the instrument the jaws are approximated and the pedicle crushed. The proctoscope is now removed and the clamp allowed to remain in position for 24 hours. During this time the patient must be kept in bed and not permitted to change position without assistance because the handle of the clamp projects for a short distance from the anus and might easily be dislodged or damage the bowel. When the clamp is to be removed the screws are loosened to the limit, thus opening the jaws. Proctoscopic examination should now be made in order to ascertain the condition of the polyp. It will slough off in two or three days. The patient should remain in bed during this time.

A recent modification permits the clamping end to be detached and remain in the rectum. The handle can be reapplied for its removal. The author reports three successful cases treated by the technic described.

V. G. BURDEN.

SOME OBSERVATIONS ON CASES OF NON-UNION OF FRACTURES IN THE LOWER THIRD OF THE TIBIA: E. L. Eliason. (Surg., Gyn. and Ob., November, 1921.) In discussing delayed or non-union of fracture of the lower third of the tibia, E. L. Eliason states that there are two groups of causative factors: extrinsic and intrinsic.

In reference to extrinsic factors he states that fixation and position have no bearing on the result, because good reduction and perfect fixation are sometimes followed by delayed or non-union. Chief among intrinsic factors are the reduction, and the blood supply. Accurate reduction has little bearing on the result provided no substance foreign to the site is interposed. The anatomy and the blood supply, however, are quite important.

The tense fascia in the lower third of the leg, when not torn, as by a compound fracture, permits of almost no stretching. This condition causes pressure on vessels and nerves, and trophic changes are the result.

The nutrient artery enters the tibia in its upper third and is cut off from the lower fragment in fractures of lower third. The anterior tibial artery is the source of the greater part of blood supply to the lower third of tibia, and is so located that it is liable to injury in these fractures. The lower third of the tibia receives only a small portion of the rich arterial anastomosis of the foot and ankle. When the posterior tibial artery is severed, it practically always means gangrene which necessitates amputation.

In a series of non-union cases of the tibia it was noted that the foot on the affected side was often cooler; the dorsalis pedis pulse was weaker; and the blood pressure

reading, taken below the fracture, was from five to fifteen millimeters mercury lower with the leg elevated, and five to ten lower with the leg hanging.

The x-ray plates of these delayed or non-union fractures show more marked osteoporosis and absorption and less callus shadow in the lower fragments. At operation, the x-ray findings are confirmed. The lower fragment is soft, spongy, osteoporotic, and shows less callus activity. There is very little filling in of the medullary canal, and there is very little bleeding from the lower fragment. Microscopic findings show that there is very much less active proliferation in the lower fragment.

In dog-experimentation, ligation of the anterior tibial made no demonstrable difference in the callus. Union, however, was a little slower in becoming firm in the ligated cases.

C. CURRY BELL.

GYNECOLOGY AND OBSTETRICS

SUPERVISORS:

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SOME FIGURES ON CAESAREAN SECTION: John M. Birnie (Boston Med. & Surg. Mag., Jan. 26, 1922). This is a study of the experience with all of the Caesarean sections done in Springfield, Mass., during a period of twelve years and is of interest in comparison with the results obtained in large special clinics.

There were 217 operations done in five hospitals by 29 operators of varying experience. During the same period 39,069 births were reported in Springfield, making an incidence of one section to 180 cases as compared with one to 133 in the Sloan Maternity. A maternal mortality of 11 per cent for the entire series, which included many unfavorable cases, is compared with figures quoted from Davis at the New York Lying-in Hospital of 10.7 per cent in a series of 571 cases. While it was impossible for the author to present detailed studies of the individual cases, he is of the opinion that results in the hands of even the occasional operator are better than is commonly believed.

It is noteworthy that a wide variety of indications were accepted and there is room for discussion as to the propriety of the treatment in many cases. The indications were as follows: 64 contracted pelvis, 4 for previous section, 53 for toxemias with a maternal mortality of 24 per cent; inertia of the uterus in 22 cases, with 4 deaths; breech presentation, 4 cases; cervical scar tissue, 4 cases; elderly primiparae, 3, with 1 death; transverse presentation, 2 cases; bicornuate uterus, 2 cases, with 1 death; face and brow presentation with 1 each; hydrocephalus, 1 case. One should note that, at least, occiput posterior presentation was not accented as an indication.

ARCHIBALD L. McDONALD.

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Annual meeting, December

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Annual meeting, December 1, 1922

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Aitkin County Medical Society

Regular meetings, first Monday in each month
Annual meeting, first Monday in December

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Graves, Carlton Aitkin	Graves, C. Aitkin	
Secretary	Kelly, B. W. Aitkin	
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Upper Mississippi County Medical Society

Crow Wing, Morrison, Cass and Beltrami Counties
Annual meeting, January 18, 1922

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Craig, C. C. International Falls	Knights, F. A. Pequot	Sweetman, R. H. Menahga
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Courtney, Walter Brainerd	McCann, D. F. Bemidji	Watson, A. M. Royalton
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THIRD DISTRICT

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Annual meeting last Monday in January

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Binger, H. E. St. Paul	Cobb, S. G. St. Paul	Giere, E. O. St. Paul
Birnberg, T. L. St. Paul	Cole, Wallace St. Paul	Gillfillan, J. S. St. Paul
Bock, R. A. St. Paul	Collie, H. G. St. Paul	Ginsberg, Wm. St. Paul
Boeckmann, Eduard St. Paul	Colvin, A. R. St. Paul	Goltz, E. V. St. Paul
Boeckmann, Egil St. Paul	Comstock, A. E. St. Paul	Gotham, C. L. St. Paul
Bohland, E. H. St. Paul	Connor, C. E. St. Paul	Gratzek, Thos. St. Paul
Bole, R. S. St. Paul	Cook, Paul B. St. Paul	Greene, C. L. St. Paul
Boleyn, E. S. St. Paul	Corniea, A. D. St. Paul	Gruenhagen, Arnold P. St. Paul

Hagaman, Geo. K.....	St. Paul	McClanahan, T. S.....	White Bear	Schatz, F. J.....	St. Paul
Hall, A. R.....	St. Paul	McCloud, C. N.....	St. Paul	Schoch, R. B. J.....	St. Paul
Hammes, E. M.....	St. Paul	McCormick, Thos. F.....	St. Paul	Schons, E.	St. Paul
Hammond, J. F.....	St. Paul	McDavitt, Thomas	St. Paul	Schuldt, F. C.....	St. Paul
Hathaway, S. J.....	Minneapolis	McKeon, Owen	St. Paul	Schulze, Albert G.....	St. Paul
Hawkins, V. J.....	St. Paul	McLaren, Jennette M.....	St. Paul	Schwytzer, Arnold	St. Paul
Health, A. C.....	St. Paul	McNevin, C. F.....	St. Paul	Senkler, G. E.....	St. Paul
Hengstler, W. H.....	St. Paul	MacLaren, Archibald.....	St. Paul	Shannon, W. Ray.....	St. Paul
Hensel, C. N.....	St. Paul	Maloney, T. J.....	St. Paul	Shellman, John L.....	St. Paul
Herrmann, E. T.....	St. Paul	Mark, Arthur E.....	St. Paul	Shimonek, Anton	St. Paul
Hesseltine, V. G.....	Taylor's Falls	Martineau, J. L.....	St. Paul	Simon, B. F.....	St. Paul
Hesselgrave, S. S.....	St. Paul	Meyerding, E. A.....	St. Paul	Simon, Geo. H.....	St. Paul
Hilger, A. W.....	St. Paul	Mitchell, Frederick	St. Paul	Skinner, H. O.....	St. Paul
Hilger, D. D.....	St. Paul	Mogilner, S. N.....	St. Paul	Sneve, Haldor	St. Paul
Hilger, L. A.....	St. Paul	Molander, H. A.....	St. Paul	Snyder, Geo. W.....	St. Paul
Hoff, Alfred	St. Paul	Molzahn, Herman E.....	St. Paul	Sohlberg, Olof	St. Paul
Hoff, Peder A.....	St. Paul	Morris, R. Edwin.....	St. Paul	Sprafka, J. M.....	St. Paul
Holcomb, J. P.....	St. Paul	Morrissey, F. B.....	St. Paul	Staley, J. C.....	St. Paul
Holcomb, O. W.....	St. Paul	Mortensen, N. G.....	St. Paul	Steen, A. H.....	Cottage Grove
Holl, P. M.....	Minneapolis	Moynihán, T. J.....	St. Paul	Sterner, E. G.....	St. Paul
Howard, W. S.....	St. Paul	Murphy, E. F.....	St. Paul	Sterner, O. W.....	St. Paul
Hullsiek, H. E.....	St. Paul	Meyers, Thos.	St. Paul	Stevens, F. A.....	Lake Elmo
Hunt, H. E.....	St. Paul	Nehrer, F. H.....	St. Paul	Stierle, Adolph, Jr.....	St. Paul
Ide, Arthur W.....	St. Paul	Nelson, L. A.....	St. Paul	Stinnette, S. E.....	St. Paul
Jesien, J. W.....	St. Paul	Nichols, A. E.....	St. Paul	Stolpestad, H. L.....	St. Paul
Johnson, Asa M.....	St. Paul	Nippert, H. T.....	St. Paul	Swanson, Edwin O.....	St. Paul
Johnson, Hartland C.....	St. Paul	Norris, E. H.....	St. Paul	Sweeney, Arthur	St. Paul
Johnson, T. H.....	St. Paul	Nye, Katherine A.....	St. Paul	Taylor, H. L.....	St. Paul
Jones, E. M.....	St. Paul	O'Brien, H. J.....	St. Paul	Teisberg, C. B.....	St. Paul
Kannary, E. L.....	St. Paul	Oerting, Harry	St. Paul	Tiber, L. J.....	St. Paul
Kelly, John V.....	St. Paul	Ogden, B. H.....	St. Paul	Van Norman, R. H.....	St. Paul
Kelly, Paul H.....	St. Paul	Ohage, Justus, Jr.....	St. Paul	Van Slyke, Chas. A.....	St. Paul
Kern, M. J.....	St. Cloud	Olson, Chas. A.....	St. Paul	Vercellini, G.....	St. Paul
Keating, Herman	St. Paul	Ostergren, E. W.....	St. Paul	Von der Weyer, William.....	St. Paul
King, Walter E.....	St. Paul	Pearson, F. R.....	St. Paul	Wald, R. H.....	St. Paul
Klein, H. N.....	St. Paul	Pedersen, A. H.....	St. Paul	Wallinga, John H.....	St. Paul
Knauff, M. K.....	St. Paul	Perry, C. G.....	St. Paul	Warren, E. L.....	St. Paul
Kramer, G. B.....	St. Paul	Peterson, V. N.....	St. Paul	Walters, B. Frank.....	St. Paul
Kvitrud, G.....	St. Paul	Pine, Auten A.....	St. Paul	Warner, E. F.....	St. Paul
Langenderfer, F. V.....	St. Paul	Plondke, F. J.....	St. Paul	Warwick, Margaret	St. Paul
Larsen, C. L.....	St. Paul	Platt, J. J.....	St. Paul	Welch, M. C.....	St. Paul
Leavenworth, R. O.....	St. Paul	Pool, Daniel	St. Paul	Wheeler, M. W.....	St. Paul
Leahy, B.....	St. Paul	Ramsey, W. R.....	St. Paul	Whitacre, J. C.....	St. Paul
Leitch, Archibald	St. Paul	Richards, E. T. F.....	St. Paul	Whitcomb, Ed. H.....	St. Paul
Lepak, John A.....	St. Paul	Riggs, C. Eugene.....	St. Paul	White, J. S.....	St. Paul
Lerche, William	St. Paul	Ritchie, H. P.....	St. Paul	Whitmore, F. W.....	St. Paul
Lewis, J. B.....	South St. Paul	Rogers, F. D.....	St. Paul	Whitney, A. W.....	St. Paul
Lewis, W. W.....	St. Paul	Rogers, John T.....	St. Paul	Williams, Clayton	St. Paul
Lick, C. Louis.....	St. Paul	Rothrock, J. L.....	St. Paul	Winnick, J. B.....	St. Paul
Little, W. J.....	St. Paul	Rothschild, H. J.....	St. Paul	Wold, K. C.....	St. Paul
Lufkin, H. M.....	St. Paul	Roy, Philemon	St. Paul	Wood, H. G.....	St. Paul
Lundholm, A. M.....	St. Paul	Rutherford, W. C.....	St. Paul	Ylvisaker, L. S.....	St. Paul
McCarthy, W. R.....	St. Paul	Ryan, John J.....	St. Paul	Zander, C. H.....	St. Paul
McClanahan, J. H.....	White Bear	Savage, F. J.....	St. Paul	Zimmerman, H. B.....	St. Paul

Washington County Medical Society

Regular meetings held on second Tuesday of the odd numbered months
Annual meeting, November

President	E. O. B. Freligh.....	Stillwater	Newman, G. A.....	Stillwater
Haines, J. H.....	Haines, J. H.....	Stillwater	Poirier, J. A.....	Forest Lake
Secretary	Humphrey, W. R.....	Stillwater	Sherman, C. H.....	Marine-on-St. Croix
Landeén, F. G.....	Kalinoft, D.	Stillwater	Stuhr, J. W.....	Stillwater
Clark, G. E.....	Landeén, F. G.....	Stillwater	Thompson, V. C.....	Stillwater
	Mingo, F. E.....	Hugo		

Chisago-Pine County Medical Society

Regular meetings
Annual meeting

President	Dredge, H. P.....	Sandstone	Magnuson, H. V.....	Bell, Cal.
Secretary	Flom, A. O.....	Chisago City	Paulson, C. W.....	North Branch
Bohling, B. S.....	Gray, Clyde E.....	Rush City	Zeien, Thos.	North Branch
	Kelsey, C. G.....	Hinckley		

Central Minnesota District Medical Society

Mille Lacs, Sherburne, Isanti and Kanabec
Regular meetings, January, April, July and October
Annual meeting, July

President	Bacon, H. P.....	Milaca	Parsons, Geo. E.....	Elk River
Cooney, H. C.....	Clifton, T. A.....	Isanti	Roodman, I. M.....	Ponsford
Secretary	Cooney, H. C.....	Princeton	Swenson, Chas.	Braham
Parsons, Geo. E.....	Frasier, Geo. W.....	Duluth	Stocking, Fred F.....	Milaca
	Phelps, A. E.....	Ogilvie	Shulean, N. S.....	Cambridge

St. Louis County Medical Society

St. Louis, Cook and Lake

Regular meetings, second Thursday of each month
Annual meeting, second Thursday in October

President
Haney, C. L. Duluth
Secretary
Magney, F. H. Duluth
Abbott, Wm. P. Duluth
Adams, B. S. Hibbing
Arminen, K. V. Duluth
Ayers, G. T. Ely
Bagley, W. R. Duluth
Baldwin, O. J. Chisholm
Barney, L. A. Duluth
Bergquist, K. E. Duluth
Binet, H. E. Grand Rapids
Bowman, P. G. Duluth
Boyer, S. H. Duluth
Braden, A. J. Duluth
Bray, C. W. Biwabik
Briggs, F. W. Duluth
Bullen, F. W. Hibbing
Burns, H. J. Duluth
Carstons, C. F. Hibbing
Chapman, T. L. Duluth
Cheney, E. L. Duluth
Clark, F. F. Duluth
Collins, A. N. Duluth
Collins, H. C. Duluth
Cosgrove, J. H. Duluth
Coventry, W. A. Duluth
Crowe, J. H. Virginia
Davis, B. F. Duluth
Davis, H. S. Duluth
Doolittle, E. L. Duluth
Drenning, F. C. Duluth
Durgen, F. L. Nopeming
Eisenman, W. F. Chisholm
Ekblad, J. W. Duluth
Eklund, J. J. Duluth
Eklund, W. J. Duluth
Elias, F. J. Duluth
Fahey, E. W. Duluth
Forbes, R. S. Duluth
Gauthier, W. Virginia
Gendron, J. F. Grand Rapids
Goodman, C. E. Virginia
Gillespie, N. H. Duluth
Graham, David. Duluth
Graham, Reginald. Duluth

Graham, Robert. Duluth
Grawn, F. A. Duluth
Greeley, L. Q. Duluth
Ground, H. T. Virginia
Hall, A. E. Cusson
Haney, C. L. Duluth
Hayes, M. F. Nashwauk
Heimark, O. E. Duluth
Hirschboeck, F. J. Duluth
Hirschfield, M. S. Duluth
Hovde, H. Duluth
Hursch, M. H. Grand Rapids
Jensen, T. J. Duluth
Judson, W. E. Duluth
Kean, N. D. Coleraine
Keisling, I. H. Hibbing
Keyes, C. R. Duluth
King, Wm. S. Eveleth
Klein, H. Duluth
Kohlbray, C. O. Duluth
Kraft, P. Duluth
Kuth, J. R. Duluth
Laird, A. T. Nopeming
Loofbourrow, E. H. Keewatin
Lenont, C. B. Virginia
Lindgren, E. I. Duluth
Linneman, N. L. Duluth
Lepak, F. J. Duluth
Lum, C. E. Duluth
Lynam, F. Duluth
McAuliffe, J. A. Duluth
McCarthy, Paul D. Babitt
McComb, C. F. Duluth
McCoy, Mary. Duluth
McDonald, A. L. Duluth
McGiffert, E. N. Duluth
McHaffie, O. L. Duluth
McIntyre, E. H. Virginia
Magie, W. H. Duluth
Magney, F. H. Duluth
Manley, J. R. Duluth
Martin, E. T. Marble
Martin, T. R. Duluth
Mattill, P. M. Chisholm
Merriman, L. L. Duluth
More, C. W. Eveleth
Morse, C. R. Hibbing

Morsman, C. F. Hibbing
Murray, D. D. Duluth
Nelson, E. H. Chisholm
Nicholson, M. A. Duluth
Oredson, O. A. Duluth
Pake, S. G. Duluth
Paradine, J. Duluth
Pare, L. T. Duluth
Parker, O. W. Ely
Payette, C. H. Duluth
Pennie, D. F. Duluth
Raadquist, C. S. Hibbing
Raihala, J. Virginia
Reynolds, H. Hibbing
Rippert, J. A. Proctor
Rood, D. C. Hibbing
Robinson, J. M. Duluth
Rowe, O. W. Duluth
Rudie, P. S. Duluth
Ryan, J. W. Duluth
St. Clair, G. G. Duluth
Saam, J. G. Eveleth
Scherer, C. A. Duluth
Schröder, C. H. Duluth
Schwartz, A. N. Duluth
Seashore, D. E. Duluth
Shapiro, E. Z. Duluth
Shaw, A. W. Buhl
Slyfield, F. F. Duluth
Spicer, F. W. Duluth
Smith, C. C. Carson Lake
Strathern, M. L. Gilbert
Strobel, W. G. Duluth
Sukeforth, L. A. Duluth
Sutherland, H. N. Ely
Tibbetts, M. H. Duluth
Tilderquist, D. L. Duluth
Tuohy, E. L. Duluth
Turnbull, F. M. Duluth
Vercellini, C. E. Duluth
Wagner, C. E. Duluth
Walker, A. E. Duluth
Webber, E. E. Proctor
Webster, H. W. Duluth
Wilkinson, Stella. Duluth
Winter, J. A. Duluth
Young, V. A. Duluth

Carlton County Medical Society

Regular meetings, first Monday of each month
Annual meeting, December

President
Stuart, A. B. Cloquet
Secretary
Raiter, Franklin W. S. Cloquet

Blakely, C. C. Barnum
Brunet, L. M. Cloquet
Fleming, J. Cloquet
Gilbert, J. R. Carlton

Raiter, Franklin W. S. Cloquet
Spurbeck, R. G. Cloquet
Stuart, A. B. Cloquet
Walters, F. R. Moose Lake

FOURTH DISTRICT

COUNCILOR, R. J. HILL (5 years) Minneapolis

Hennepin County Medical Society

Regular meetings, first Monday in each month excepting July and August
Annual meeting, first Monday in January

President
Benjamin, A. E. Minneapolis
Secretary
La Vake, R. T. Minneapolis
Abbott, A. W. Minneapolis
Adair, F. L. Minneapolis
Aling, C. P. Minneapolis
Allen, H. W. Minneapolis
Almqvist, H. E. Minneapolis
Anderson, A. E. Minneapolis
Anderson, Arnt. Minneapolis
Anderson, J. D. Minneapolis
Anderson, James K. Minneapolis
Annis, H. B. Minneapolis
Arey, H. C. Excelsior
Aune, Martin. Minneapolis
Aurand, W. H. Minneapolis
Aurness, P. A. Minneapolis
Austin, E. E. Minneapolis
Avery, J. F. Minneapolis
Alymer, A. L. Minneapolis
Baier, Florence. Minneapolis
Baker, A. T. Minneapolis

Baker, E. L. Minneapolis
Baker, Loee. Minneapolis
Baker, Harry A. Minneapolis
Bakke, O. H. Minneapolis
Baldwin, L. B. Minneapolis
Bank, H. E. Minneapolis
Barner, Henry Adolph. Minneapolis
Barten, E. R. Minneapolis
Bass, G. W. Minneapolis
Barron, Moses. Minneapolis
Baxter, S. H. Minneapolis
Beard, Archie. Minneapolis
Beaudoux, Henry A. Minneapolis
Bell, J. W. Jr. Minneapolis
Bell, J. W. Sr. Minneapolis
Benedict, E. E. Minneapolis
Benjamin, A. E. Minneapolis
Benn, F. G. Minneapolis
Benson, Geo. E. Minneapolis
Benson, R. D. Minneapolis
Bessesen, A. N. Minneapolis
Bishop, Chas. W. Minneapolis

Bissell, F. S. Minneapolis
Blake, Jam. S. Hopkins
Bockman, M. Minneapolis
Booth, A. E. Minneapolis
Boquist, E. T. W. Minneapolis
Boreen, C. A. Minneapolis
Bowman, H. A. H. Minneapolis
Bratrud, Arthur F. Minneapolis
Broker, W. S. Minneapolis
Brooks, Chas. N. Minneapolis
Brown, E. J. Minneapolis
Brown, Edwin D. Minneapolis
Brown, Paul F. Minneapolis
Brown, R. S. Minneapolis
Bulkley, Kenneth. Minneapolis
Butler, John. Minneapolis
Byrnes, W. J. Minneapolis
Cabot, V. S. Minneapolis
Camp, Walter E. Minneapolis
Campbell, Lowell N. Minneapolis
Campbell, Robert. Minneapolis
Carey, Jas. B. Minneapolis
Cavanor, F. T. Minneapolis

Carlaw, C. M.....	Minneapolis	Irvine, H. G.....	Minneapolis	Nelson, O. E.....	Minneapolis
Cheleen, S. J.....	Minneapolis	Jarvis, B. W.....	Minneapolis	Newhart, Horace....	Minneapolis
Chowning, Wm.....	Minneapolis	Jensen, M. J.....	Minneapolis	Nippert, L. A.....	Minneapolis
Cirkler, A. A.....	Minneapolis	Johnson, A. E.....	Minneapolis	Nixon, Chas E.....	Minneapolis
Clark, Howard S.....	Minneapolis	Johnson, A. Elof.....	Minneapolis	Noice, Russell R.....	Minneapolis
Condit, W. H.....	Minneapolis	Johnson, Carl E.....	Minneapolis	Noonan, Dan F.....	Minneapolis
Cook, H. W.....	Minneapolis	Johnson, James A.....	Minneapolis	Noran, A. N.....	Minneapolis
Corbett, J. Frank.....	Minneapolis	Johnson, Julius.....	Minneapolis	Nordin, G. T.....	Minneapolis
Cozman, E. O.....	Minneapolis	Johnson, Morton T.....	Minneapolis	Nordland, Martin.....	Minneapolis
Crafts, L. N.....	Minneapolis	Johnson, Nimrod A.....	Minneapolis	Noth, H. W.....	Minneapolis
Cranmer, Richard R.....	Minneapolis	Johnson, Odin J.....	Minneapolis	Oberg, C. M.....	Minneapolis
Cross, John G.....	Minneapolis	Johnson, R. A.....	Minneapolis	O'Donnell, J. E.....	Minneapolis
Crume Geo. F.....	Minneapolis	Jones, H. W.....	Minneapolis	Olson, Frederick A.....	Minneapolis
Curtin, John F.....	Minneapolis	Jones, W. A.....	Minneapolis	Olson, G. M.....	Minneapolis
Cutts, Geo.....	Minneapolis	Josewich, Alexander.....	Minneapolis	Olson, Olaf A.....	Minneapolis
Dahl, Elmer O.....	Minneapolis	Kennedy, C. C.....	Minneapolis	Orton, H. N.....	Minneapolis
Dahl, John A.....	Minneapolis	Kennedy, James.....	Minneapolis	Owre, Oscar.....	Minneapolis
Dahlstrom A. W.....	Minneapolis	Kennedy, R. R.....	Minneapolis	Parker, E. H.....	Minneapolis
Dart, L. D.....	Minneapolis	Kerrick, Stanley E.....	Minneapolis	Parks, A. H.....	Minneapolis
Daniel, Donald H.....	Minneapolis	Kimball, H. H.....	Minneapolis	Paulson, E. L.....	Minneapolis
Datzel, G.....	Minneapolis	King, E. A.....	Minneapolis	Pearce, N. O.....	Minneapolis
Disen, C. F.....	Minneapolis	King, W. R.....	Minneapolis	Pederson, R. M.....	Minneapolis
Donaldson, C. A.....	Minneapolis	Kirmse, Geo. W.....	Minneapolis	Peppard, T. A.....	Minneapolis
Dornblaser, H. Bright	Minneapolis	Kistler, C. M.....	Minneapolis	Perry, Ralph St. John.....	Minneapolis
Doxey, G. L.....	Minneapolis	Kistler, J. R.....	Minneapolis	Peters, R. M.....	Minneapolis
Dorge, Richard.....	Minneapolis	Knight, R. M.....	Minneapolis	Patterson, W. E.....	Minneapolis
Drake, Chas. R.....	Minneapolis	Knight, Ralph T.....	Minneapolis	Peterson, J. R.....	Minneapolis
Driesbach, N.....	Minneapolis	Knight, H. L.....	Minneapolis	Peterson, O. H.....	Minneapolis
Dunn, Lewis.....	Minneapolis	Koch, John C.....	Minneapolis	Peterson, Thorvald.....	Minneapolis
Dunsmoor, F. A.....	Minneapolis	Kohler, Geo. A.....	Minneapolis	Pettit, C. W.....	Minneapolis
Dunn, Geo. Robert.....	Minneapolis	Koller, H. M.....	Minneapolis	Peyton, Wm. L.....	Minneapolis
Dutton, E. C.....	Minneapolis	Koller, L. R.....	Minneapolis	Phelps, Kenneth, A.....	Minneapolis
Egan, John M.....	Minneapolis	Kremer, Walter J.....	Minneapolis	Pineo, W. P.....	Minneapolis
Eggen, O. K.....	Minneapolis	Kriedt, Daniel.....	Minneapolis	Poehler, F. T.....	Minneapolis
Eglsrud, Kristian.....	Minneapolis	Kucera, Wm. J.....	Hopkins	Poppe, F. H.....	Minneapolis
Eitel, G. G.....	Minneapolis	Kuske, A. L.....	Minneapolis	Pratt, Fred J.....	Minneapolis
Eisler, Edwin R.....	Minneapolis	Leboske, Jos. A.....	Minneapolis	Pratt, J. A.....	Minneapolis
Erb, Fred A.....	Minneapolis	LaJoie, J. M.....	Minneapolis	Preine, Irvin A.....	Minneapolis
Everlof, J. L.....	Minneapolis	LaPierre, C. A.....	Minneapolis	Prim, J. A.....	Minneapolis
Ericson, John G.....	Minneapolis	Lane, Laura A.....	Minneapolis	Quinby, Thos. F.....	Minneapolis
Fansler, W. A.....	Minneapolis	Laurent, A. A.....	Minneapolis	Quist, Henry W.....	Minneapolis
Farr, R. E.....	Minneapolis	Law, A. A.....	Minneapolis	Ravu, Bjarne.....	Minneapolis
Feldt, W. W.....	Minneapolis	LaVack, R. T.....	Minneapolis	Reed, Chas. E.....	Minneapolis
Fischer, G.....	Minneapolis	Leavitt, H. H.....	Minneapolis	Rees, S. P.....	Minneapolis
Fitzgerald, D.....	Minneapolis	Lee, John W.....	Minneapolis	Rizor, R. J.....	Minneapolis
Fjellman, R. C.....	Minneapolis	Lee, Thos. G.....	Minneapolis	Reynolds, J. S.....	Minneapolis
Fjelstad, C. Alford.....	Minneapolis	Leland, M. N.....	Minneapolis	Rishmiller, J. H.....	Minneapolis
Fleming, A. S.....	Minneapolis	Lemstrom, Jarl.....	Minneapolis	Roan, Carl M.....	Minneapolis
Flocken, Chas. F.....	Minneapolis	Lewis, J. D.....	Minneapolis	Roberts, Thos. S.....	Minneapolis
Fox, John M.....	Minneapolis	Lind, C. J.....	Minneapolis	Roberts, W. B.....	Minneapolis
Franzen, H. C.....	Minneapolis	Linner, H. P.....	Minneapolis	Robitshek, E. C.....	Minneapolis
Gardner, E. L.....	Minneapolis	Litchfield, John.....	Minneapolis	Rochford, W. E.....	Minneapolis
Geist, Emil.....	Minneapolis	Litzenberg, J. C.....	Minneapolis	Rodda, F. C.....	Minneapolis
Gessler, Paul W.....	Minneapolis	Logefeil, Rudolph.....	Minneapolis	Rodgers, C. L.....	Minneapolis
Gilles, L. L.....	Minneapolis	Long, Jesse.....	Minneapolis	Rosenwald, R. M.....	Minneapolis
Gordon, G. J.....	Minneapolis	Loomis, E. A.....	Minneapolis	Rosen, S.....	Minneapolis
Gosin, D. F.....	Minneapolis	Lynch, N. J.....	Minneapolis	Rypins, Harold.....	Minneapolis
Graves, Floyd.....	Minneapolis	Lundgren, A. C.....	Minneapolis	Sawatzka, Wm. A.....	Minneapolis
Green, E. K.....	Minneapolis	Lyng, John.....	Minneapolis	Schaaf, Fred K.....	Minneapolis
Goss, Harold L.....	Rochester	Lyon, J. D.....	Minneapolis	Scheffek, J. F.....	Minneapolis
Groll, S.....	Minneapolis	Lysne, Henry.....	Minneapolis	Scheldrup, N. M.....	Minneapolis
Guilford, H. M.....	Minneapolis	McCarthy, Donald.....	Minneapolis	Schmitt, Aaron F.....	Minneapolis
Gunderson, Harley J.....	Minneapolis	McDaniel Oriana.....	Minneapolis	Schneider, J. P.....	Minneapolis
Hacking, Frank.....	Minneapolis	McDermott, T. E.....	Minneapolis	Schultz, F. W.....	Minneapolis
Hagen, G. L.....	Minneapolis	MacDonald, A. E.....	Minneapolis	Schussler, Otto F.....	Minneapolis
Haggard, G. D.....	Minneapolis	McDonald, H. N.....	Minneapolis	Schwyzzer, G.....	Minneapolis
Hall, J. M.....	Minneapolis	McDonald, I. C.....	Minneapolis	Seashore, Gilbert.....	Minneapolis
Hallowell, W. H.....	Minneapolis	McEachran, A.....	Minneapolis	Sedgwick, J. P.....	Minneapolis
Hamel, Arnold L.....	Minneapolis	McFarland, Arthur H.....	Minneapolis	Seham, Max.....	Minneapolis
Hamel, C. E.....	Minneapolis	McIntyre, Geo.....	Minneapolis	Sessions, J. C.....	Minneapolis
Hamilton, A. S.....	Minneapolis	McLaughlin, Jas. A.....	Minneapolis	Simons, J. H.....	Minneapolis
Hansen, Erling.....	Minneapolis	McKinney, F. S.....	Minneapolis	Simpson, Ellery D.....	Minneapolis
Hanson, Olga.....	Minneapolis	MacDonald, D. A.....	Minneapolis	Simpson, J. D.....	Minneapolis
Hare, E. R.....	Minneapolis	McPheeters, H. O.....	Minneapolis	Sivertsen, Andrew.....	Minneapolis
Hartig, Hugo J.....	Minneapolis	Maland, D. O.....	Minneapolis	Sivertsen, Iver.....	Minneapolis
Harrington, C. D.....	Minneapolis	Maquire, Leo.....	Minneapolis	Slocumb, Maude.....	Minneapolis
Hartzell, Thos. B.....	Minneapolis	Mann, A. T.....	Minneapolis	Smith, Adam, M.....	Minneapolis
Haverfield, Addie R.....	Minneapolis	Marslay, W. J.....	Minneapolis	Smith, Art. E.....	Minneapolis
Hayes, J. M.....	Minneapolis	Macnie, John.....	Minneapolis	Smith, Homer R.....	Minneapolis
Haynes, F. E.....	Minneapolis	Mark, D. E.....	Minneapolis	Smith, John F.....	Minneapolis
Head, G. D.....	Minneapolis	Mathews, Justus.....	Minneapolis	Smith, Norman M.....	Minneapolis
Hearn, Wm. O.....	Minneapolis	Merkert, G. L.....	Minneapolis	Soderlind, A.....	Minneapolis
Hedback, A. E.....	Minneapolis	Mariette, E.....	Hopkins	Souba, Fred. J.....	Minneapolis
Hedding, J. A.....	Minneapolis	Maxeiner, Stanley R.....	Minneapolis	Spratt, C. N.....	Minneapolis
Heim, R. R.....	Minneapolis	May, W. H.....	Minneapolis	Staples, H. L.....	Minneapolis
Helk, H. H.....	Minneapolis	Mead, Marion A.....	Minneapolis	Stomel, Joseph.....	Minneapolis
Hendrickson, J. F.....	Minneapolis	Meyer, E. L.....	Minneapolis	Strachauer, A. C.....	Minneapolis
Henry, C. E.....	Minneapolis	Michael, J. C.....	Minneapolis	Strout, E. S.....	Minneapolis
Heibert, J. P.....	Minneapolis	Michaelson, H. E.....	Minneapolis	Strout, G. Elmer.....	Minneapolis
Higgins, J. H.....	Minneapolis	Michaelson, Henry E.....	Minneapolis	Stuhr, Henry C.....	Minneapolis
Hill, Eleanor J.....	Minneapolis	Miller, F. C.....	Minneapolis	Sweetser, H. B.....	Minneapolis
Hill, R. J.....	Minneapolis	Moir, Wm. W.....	Minneapolis	Swendseen, Carl G.....	Minneapolis
Hirschfield, Adolph.....	Minneapolis	Moahan, J. A.....	Minneapolis	Sweetser, Theo.....	Minneapolis
Hobbs, C. A.....	Minneapolis	Moorehead, M. B.....	Minneapolis	Switzer, S. E.....	Minneapolis
Hodge, S. V.....	Minneapolis	Moren Ed.....	Minneapolis	Taft, J. O.....	Minneapolis
Hoegh, Knut.....	Minneapolis	Morrison, A. W.....	Minneapolis	Taft, Walter L.....	Minneapolis
Holen, T.....	Minneapolis	Morse, John H.....	Minneapolis	Tanner, Alvin C.....	Minneapolis
Holm, Geo. A.....	Minneapolis	Morton, H. McI.....	Minneapolis	Taylor, Rood.....	Minneapolis
Howe, A. W.....	Minneapolis	Murphy, I. J.....	Minneapolis	Tennyson, Theo.....	Minneapolis
Huenekens, E. J.....	Minneapolis	Murray, Wm. R.....	Minneapolis	Thomas, D. O.....	Minneapolis
Hughes, L. D.....	Minneapolis	Myers, J. A.....	Minneapolis	Thomas, Geo. E.....	Minneapolis
Hvoslef, Jacob.....	Minneapolis	Nelson, C. P.....	Owatonna	Thomas, Geo. H.....	Minneapolis
Hynes, James.....	Minneapolis	Nelson, H. S.....	Minneapolis	Thomas, Gilbert.....	Minneapolis
Hynes, John E.....	Minneapolis			Thompson, Herb. H.....	Minneapolis
Ikedu, Kano.....	Minneapolis				

Tigndale, A. C.....Minneapolis
 Towers, F. E.....Minneapolis
 Tunstead, Hugh.....Minneapolis
 Tyrell, C. C.....Minneapolis
 Ulrich, Henry L.....Minneapolis
 Undine, Clyde A.....Minneapolis
 Urstad, O. H.....Minneapolis
 Van Deboget, Lewis.....Minneapolis
 Voyer, Emile O.....Minneapolis
 Waldron, C. W.....Minneapolis
 Wanous, E. Z.....Minneapolis
 Ward, A. W.....Minneapolis
 Ward, Percy.....Minneapolis
 Warham, T. T.....Minneapolis
 Watson, C. W.....Minneapolis
 Watson, J. A.....Minneapolis

Webb, R. C.....Minneapolis
 Weisman, Sam.....Minneapolis
 Wells, H. J.....Minneapolis
 Weston, C. G.....Minneapolis
 Wethall, A. G.....Minneapolis
 Weum, T. W.....Minneapolis
 Whetstone, Mary S.....Minneapolis
 White, S. Marx.....Minneapolis
 White, Willard D.....Minneapolis
 Wilcox, Archib, E.....Minneapolis
 Wilcox, M. Russell.....Minneapolis
 Willcutt, Clarence.....Minneapolis
 Williams, H. L.....Minneapolis
 Williams, Robert.....Minneapolis
 Willson, Hugh S.....Minneapolis

Wipperman, Paul.....Minneapolis
 Witham, C. A.....Minneapolis
 Wittich, F. W.....Minneapolis
 Wohlrahe, A. A.....Minneapolis
 Wood, Douglas F.....Minneapolis
 Woodard, F. R.....Minneapolis
 Woodworth, Elizab.....Minneapolis
 Wright, C. D.....Minneapolis
 Wright, C. B.....Minneapolis
 Wright, F. R.....Minneapolis
 Wyatt, O. S.....Minneapolis
 Wynne, H. M. N.....Minneapolis
 Yoerg, C. W.....Minneapolis
 Zaworski, E. A.....Minneapolis
 Ziskin, Thos.....Minneapolis

Wright County Medical Society

Regular meetings, first Monday quarterly
 Annual meeting, October

President
 Shrader, E. E.....Watertown
 Secretary
 Catlin, John J.....Buffalo
 Catlin, John J.....Buffalo

Elleson, Frank.....Monticello
 Freed, O. J. R.....Cokato
 Harriman, L.....Howard Lake
 Hawkins, E. P.....Montrose
 Metcalf, J. N.....Monticello
 Moffatt, A. G.....Howard Lake

Phillips, A. E.....Delano
 Ridgway, A. M.....Annandale
 Rousseau, Victor.....Maple Lake
 Roholt, C. L.....Waverly
 Shrader, E. E.....Watertown
 Thoresen, Th.....Buffalo

Meeker County Medical Society

President
 Donovan, J. J.....Litchfield
 Secretary
 Danielson, K. A.....Litchfield
 Brigham, Frank.....Watkins

Cutts, G. A. C.....Litchfield
 Danielson, K. A.....Litchfield
 Donovan, J. J.....Litchfield
 Delude, S.....Dassel
 French, H. S.....Grove City

O'Connor, D. C.....Eden Valley
 Peterson, Alfred.....Dassel
 Robertson, A. W.....Litchfield
 Robertson, W. P.....Litchfield
 Sturre, J. R.....Watkins

Stearns-Benton County Medical Society

Regular meetings quarterly
 Annual meeting, third Thursday in April

President
 Hempstead, Werner.....St. Cloud
 Secretary
 Clark, H. B.....St. Cloud
 Ausman, Carl F.....Paynesville
 Beebe, W. L.....St. Cloud
 Beaty, James H.....St. Cloud
 Boehm, John C.....St. Cloud
 Clark, Harry B.....St. Cloud
 Dunn, J. B.....St. Cloud
 Du Bois, Julian F.....Sauk Center
 Du Bois, Julian A.....Sauk Center

Freeman, W. L.....Foley
 Friesleben, Wm.....Sauk Rapids
 Guilde, W. C.....St. Cloud
 Gelz, John J.....Richmond
 Glyer, R. T.....Brooten
 Goehrs, H. W.....St. Cloud
 Hempstead, Werner.....St. Cloud
 Holdridge, G. A.....Foley
 Kuhlman, Aug.....Melrose
 Lamb, Harold L.....Sauk Center
 Lewis, E. J.....Sauk Center
 Lewis, C. R.....St. Cloud
 McDowell, J. P.....St. Cloud
 Moynihan, And. F.....Sauk Center

May, C. E.....Masonic Temple, Minneapolis
 McKibben, W. E.....St. Cloud
 Putney, Geo. W.....Paynesville
 Pilon, P. C.....Paynesville
 Rathburn, A. M.....Rice
 Rathburn, C. A.....Sauk Rapids
 Ridgeway, Alex.....Belgrade
 Rice, G. D.....St. Cloud
 Sherwood, G. E.....Kimball
 Sutton, Chas. S.....St. Cloud
 Townsend, De Wayne.....Belgrade
 Watson, Talbert.....Albany
 Wolner, Oscar H.....Gilbert

Kandiyohi-Swift County Medical Society

Regular meetings, third Thursday in March, June, September and December
 Annual meeting, third Thursday in December

President
 Davison, P. C.....Willmar
 Secretary
 Jacobs, John C.....Willmar
 Anderson, R. E.....Willmar
 Benson, I. S.....Willmar
 Branton, A. F.....Willmar

Branton, B. J.....Willmar
 Daignault, O.....Benson
 Davison, P. C.....Willmar
 Ehrenberg, C. J.....Willmar
 Frost, E. H.....Willmar
 Hanson, H. J.....New London
 Hanson, H. V.....Willmar

Jacobs, Jno. C.....Willmar
 Johnson, H.....Kerkhoven
 Kaufman, Wm. C.....Appleton
 Kolset, Carl D.....Benson
 Rains, John M.....Willmar
 Scofield, C. L.....Benson
 Shelver, H. J.....Ortonville

FIFTH DISTRICT

COUNCILOR, H. M. WORKMAN (1 year).....Tracy

Camp Release District Medical Society

Renville, Chippewa, Lac Qui Parle and Sibley Counties
 Regular meetings, fourth Thursday in January, April, July and October
 Annual meeting, fourth Thursday in October

President
 Adams, R. C.....Bird Island
 Secretary
 Peterson, H. E.....Granite Falls
 Adams, R. C.....Bird Island
 Aldrich, F. R.....Belview
 Bacon, R. S.....Montevideo
 Bergh, L. N.....Montevideo
 Barfield, J. J.....Granite Falls
 Bushey, M. E.....Arlington
 Brand, W. A.....Redwood Falls
 Burns, M. A.....Milan
 Clay, E. M.....Renville
 Crandall, A. M.....Madison
 Cress, E. E.....Boyd

Cole, H. B.....Redwood Falls
 Duclos, J. A.....Henderson
 Eisengraber, G. A.....Granite Falls
 Ferguson, J. B.....St. Paul
 Flinn, T. E.....Redwood Falls
 Flinn, B. P.....Redwood Falls
 Flower.....Minneapolis
 Friech, Frank P.....Gibbon
 Gaines, E. C.....Buffalo Lake
 Guyer, L. G.....Waseca
 Hauge, M. M.....Clarkfield
 Holmberg, L. J.....Canby
 Johnson, H. M.....Dawson
 Jones, R. N.....Gaylord
 Johnson, C. M.....Dawson
 Kilbride, J. S.....Canby

Lee, W. N.....Madison
 Lima, Ludwig.....Montevideo
 Mesker, G. H.....Olivia
 Mec, P. H.....Osseo
 Nelson, N. A.....Dawson
 Olson, W. P.....Gaylord
 Peterson, H. E.....Granite Falls
 Puffer, F. L.....Bird Island
 Penhall, F. W.....Morton
 Passer, A. A.....Olivia
 Selle, Fred.....Winthrop
 Stemsrud, A. A.....Dawson
 Smith, L. G.....Montevideo
 Sherman.....Franklin
 Westby, N.....Madison
 Zimbach, R. D.....Maynard

Redwood-Brown County Medical Society

Regular meeting, June
Annual meeting, August 10th

President
Walker, C. C.....Lamberton
Secretary
Meierding, Wm. A.....Springfield
Borgeson, Egbert Hanska
Dubbe, F. H.....New Ulm
Eckstein, A. W.....Comfrey
Gray, F. D.....Marshall

Hammermeister, Theo. F.....
New Ulm
Haskins, J. L.....Morgan
Jamieson, Earl Walnut Grove
Meierding, Wm. A.....Springfield
Peland, F. J. New Ulm
Perkins, John W.....Sanborn
Peterson, R. A. Vesta

Strickler, A. F.....Sleepy Eye
Strickler, Mary Sleepy Eye
Sundt, Mathias Minneapolis
Schoch, J. L. New Ulm
Shrader, J. S. Springfield
Rothenburg, J. C.....Springfield
Walker, C. C.....Raymond
Weiser, Geo. B.....New Ulm

Lyon-Lincoln County Medical Society

Regular meetings, first Tuesday in March, May and July
Annual meeting, October

President
Workman, W. E.....Tracy
Secretary
Workman, H. M.....Tracy
Bacon, C. G. Marshall
Bossingham, O. N. ..Lake Benton

Engh, Sigfred Cottonwood
Germa, Chas. Balaton
Hoidale Tracy
Jacquaoat Tyler
Jensen, J. C. Hendricks
McCoy, J. E. Ivanhoe
Persons, C. E. Marshall

Robertson, J. B.....Cottonwood
Thordarson, Theo. Minneota
Vadheim, A. L.....Tyler
Valentine, W. H. Tracy
Workman, H. M. Tracy
Workman, W. E.....Tracy

SIXTH DISTRICT

COUNCILOR, F. R. WEISER (2 years).....Windom

Southwestern Minnesota Medical Society

Pipestone, Rock, Murray, Nobles, Cottonwood, Jackson Counties
Regular meetings, May 12th
Annual meeting, November 10th

President
Mork, B. O. Worthington
Secretary
Piper, Wm. A.....Mountain Lake
Atkins, G. L. Jackson
Arnold, E. W. Adrian
Balcom, G. G.....Lake Wilson
Bong, J. H. Jasper
Brown, A. H. Pipestone
Biorn, N. A. Jackson
Chadbourn, A. G.....Heron Lake
Cress, P. J. Ellsworth
De Boer, Herman.....Edgerton
Dolan, C. P. Worthington
Doms, H. C. Slayton
Ditmeier, I. M. Gerber....Jasper
Dudley, J. H. Windom
Goldberg Jasper

Golden, C. M. Tyler
Hitchings, W. P.....Lakefield
Hilger, J. M. Iona
Holloran, Walter Jackson
Johnson, Ellsworth Windom
Keeling, F. L. Lakefield
Leebens, J. H. Lismore
Leigh, H. J. Lakefield
Lowe, Thos. Pipestone
Lowe, Thos. A. Pipestone
McCrea, Jas. Fulda
McKeown, E. G. Pipestone
Manson, F. M.....Worthington
May, C. C. Adrian
Metcalf, F. W.....Worthington
Mork, B. O. Worthington
Niesbaum, W. H.....Jackson
Patterson, W. E.....Westbrook
Piper, Wm. A.....Mountain Lake
Portman, W. C.....Jackson

Richardson, W. E.....Pipestone
Richmond, Chas. D.....Jeffers
Rose, J. F. Lakefield
Stanley, C. R. Worthington
Sherman, C. L. Luverne
Smallwood, J. F.....Worthington
Slater, A. A.....Worthington
Sogge, L. Windom
Taylor, Wm. J.....Pipestone
Thorson, E. O. Luverne
Tofts, Josephine Minneapolis
Tiedeman, I. D.....Heron Lake
Tiedeman, E. J.....Adrian
Waller, Jas. D.....Wilmont
Watson, F. G.....Worthington
Weiser, F. R.....Windom
Williams, A. L.....Slayton
Wright, C. O. Luverne
Vadheim, A. L. Tyler

Blue Earth Valley Medical Society

Martin and Faribault Counties
Regular meetings, May and October
Annual meeting, May

President
Dewey, Geo. W.....Fairmont
Secretary
Hunt, R. C. Fairmont
Bailey, H. B. Ceylon
Broberg, J. A.....Blue Earth
Butz, J. A.....Monterey
Barr, W. H.....Wells
Best, F. E.....Wells

Cooper, M. D....Winnebago City
Chambers, W. C.....Blue Earth
Dewey, G. W.....Fairmont
Farrage, J. H....Winnebago City
Henderson, A. G.....Kiester
Hunt, F. N.....Fairmont
Hunt, R. C.....Fairmont
Hunte, A. F.....Truman
Herman, S. Welcome
Jacobs, A. C.....Elmore

Johnson, H. P.....Fairmont
Luedtke, G. H.....Fairmont
Logan, F. W.....Blue Earth
McGroarty, J. J.....Easton
Maikan, M. H.....Fairmont
Richardson, W. J.....Fairmont
Sybilrud, H. W.....Bricelyn
Silbernail, F. P.....Elmore
Wilson, C. E.....Blue Earth

Watowwan County Medical Society

Annual meeting, December

President
Hagen, O. E.....Butterfield
Secretary
Grimes, H. B.....Madelia

Grimes, H. B.....Madelia
Hagen, O. E.....Butterfield
Kabrick, O. A.....Odin
McCarthy, W. J.....Madelia

Rowe, W. H. St. James
Ternstrom, O. H.....St. James
Thompson, Albert St. James

SEVENTH DISTRICT

COUNCILOR, F. A. DODGE, M. D. (5 years) Le Sueur

Nicollet-Le Sueur County Medical Society

Regular meetings, September and December
Annual meeting, December

President
Aitkens, H. B. Le Sueur Center
Secretary
Le Clerc, J. E. Le Sueur
Aitkens, H. B. Le Sueur Center
Baskett, Geo. T. St. Peter

Baskett, Olive T. St. Peter
Behmler, Fred W. Lafayette
Covell, W. W. St. Peter
Daniels, J. W. St. Peter
Dodge, F. A. Le Sueur
Eirley, Clara. Mt. Pleasant, Iowa
Hartung, H. A. Le Sueur

Le Clerc, J. E. Le Sueur
McDougald, D. W. Le Sueur
Olson, R. G. Minneapolis
Phelps, R. M. St. Peter
Strathern, F. P. St. Peter
Wentworth, L. F. Le Sueur Center

McLeod County Medical Society

Regular meetings, January, April, July and October
Annual meeting, January

President
Maurer, E. L. Brownston
Secretary
Maurer, E. L. Brownston

Balles, D. W. Galveston, Texas
Clement, J. E. Lester Prairie
Clair, J. B. Winsted
Jellison, E. R. New Auburn
Maurer, E. L. Brownston

Kohler, E. G. Hector
Sheppard, Fred Hutchinson
Sheppard, P. E. Hutchinson
Tinker, C. W. Stewart

Scott-Carver Medical Society

Regular meetings, first Thursday in March, June, September and December
Annual meeting, first Thursday in December

President
Bohland, F. J. Belle Plaine
Secretary
Reiter, H. W. Shakopee
Von Bohland, F. J. Belle Plaine
Buck, Fred H. Shakopee

Cannedy, Edw. W. Prior Lake
Fischer, H. P. Shakopee
Fischer, P. M. Shakopee
Henriksen, H. G. New Market
Landenberger, John. New Prague
Maertz, W. F. New Prague
Moloney, G. R. Belle Plaine

Mulder, John L. Cavalier, N. D.
Novak, Edw. E. New Prague
Phillips, Wm. H. Jordan
Reiter, H. W. Shakopee
Schneider, H. A. Jordan
White, J. B. Belle Plaine

Goodhue County Medical Society

Regular meetings, January 12th and August 15th
Annual meeting, January

President
Werner, N. L. Red Wing
Aanes, A. M. Red Wing
Secretary
Werner, N. L. Red Wing

Anderson, J. V. Red Wing
Beyers, A. G. Red Wing
Claydon, L. E. Red Wing
Conley, Alva Cannon Falls
Conley, H. E. Cannon Falls
Cremer, M. H. Red Wing

Gates, J. A. Kenyon
Johnson, A. E. Red Wing
Jones, A. W. Red Wing
McGuigan, H. T. Red Wing
Werner, N. L. Red Wing

Rice County Medical Society

Regular meetings quarterly
Annual meeting, December 20th

President
Morse, W. E. H. Morristown
Secretary
Robilliard, C. M. Faribault
Babcock, F. M. Northfield
Davis, F. U. Faribault
Errickson, W. A. Faribault
Haessley, S. B. Faribault
Hanson, A. M. Faribault

Huxley, E. R. Faribault
Kanne, C. W. Faribault
Lee, W. P. Northfield
Lexa, F. J. Lonsdale
Mayland, M. L. Faribault
Morse, W. E. H. Morristown
Moses, Joseph, Jr. Northfield
Fields, Martin Northfield
Phillips, J. G. Northfield

Plonske, C. J. Faribault
Robilliard, C. M. Faribault
Robilliard, W. H. Faribault
Rumpf, W. H. Faribault
Smith, P. A. Faribault
Theissen, W. H. Faribault
Traeger, C. A. Faribault
Warren, F. S. Faribault
Wilson, Warren Northfield

Wabasha County Medical Society

Regular meetings, annually first Thursday after first Monday in July

President
Branyan, Hugo Wabasha
Secretary
Schmidt, G. Lake City
Bayley, E. H. Lake City

Bowers, J. T. Lake City
Bowers, H. E. Lake City
Branyan, Hugo Wabasha
Dempsey, D. P. Kellogg
Fleischhauer, D. S. Wabasha
Radabaugh, R. C. Hastings

Rankin, A. A. Zumbro Falls
Replogle, W. H. Wabasha
Schmidt, G. Lake City
Slocumb, J. A. Plainview
Sutton, L. F. Mazeppa
Wilson, W. F. Lake City

EIGHTH DISTRICT

COUNCILOR, W. F. BRAASCH, M. D. (2 years).....Rochester

Blue Earth County Medical Society

Regular meetings, last Monday in each month
Annual meeting, last Monday in December

President	Dahl, Gerhard A.....Mankato	Merrill, James E.....Amboy
Wentworth, A. J.....Mankato	Edwards, Ralph T.....Elysian	Miller, Victor.....Mankato
Secretary	Franchere, Fred W.....Lake Crystal	Osborn, Lida.....Mankato
Snell, A. M.....Mankato	Hulcher, Julian A.....Mankato	Pratt, Chelsea C.....Mankato
Andrews, John W.....Mankato	Holbrook, John S.....Mankato	Schlesselman, J. Theo.....Mankato
Andrews, Roy N.....Mankato	Holman, Carl J.....Mankato	Schmidt, Paul A.....Good Thunder
Benham, Edward W.....Mankato	James, John H.....Mankato	Snell, Albert M.....Mankato
Black, William.....Mankato	Kemp, Alphonse F.....Mankato	Schmer, Alphonse E. J.....Mankato
Denman, Austin V.....Mankato	Liedloff, Adolph G.....Mankato	Wentworth, Albert J.....Mankato
	Lloyd, Hiram J.....Mankato	Williams, Hugh O.....Mankato

Houston-Fillmore County Medical Society

No regular meetings
Annual meeting, October

President	Fischer, O. F.....Houston	Nass, H. A.....Mabel
Helland, G. M.....Houston	Foster, B. W.....Spring Valley	Onsgard, C. K.....Halstad
Secretary	Helland, J. W.....Spring Grove	Onsgard, L. K.....Houston
Fischer, O. F.....Houston	Helland, G. W.....Spring Grove	Rhines, D. C.....Caledonia
Anderson, Norman E.....Harmony	Kibbe, O. A.....Canton	Sather, E. R.....Spring Valley
Browning, W. E.....Caledonia	Kierland, P. E.....Harmony	Tierney, C. M.....Granger
Christianson, H. W.....Wykoff	Lannin, J. C.....Mabel	Williams, R. V.....Rushford
Drake, F. A.....Lanesboro	Love, Geo. A.....Preston	Utley, J. D.....Santa Monica, Cal.
	Nelson, M. S.....Spring Grove	

Mower County Medical Society

Regular meetings, second Wednesday in January, April, July and October
Annual meeting, second Wednesday in October

President	Grise, W. B.....Austin	Morris, E. H.....Austin
Morris, E. H.....Austin	Hegge, C. A.....Austin	Morse, M. P.....LeRoy
Secretary	Hegge, O. H.....Austin	Melzer, G. R.....Lyle
Lommen, P. A.....Austin	Hertel, G. A.....Austin	Shottler, G. L.....Dexter
Allen, A. W.....Austin	Henslin, A. E.....LeRoy	Shipley, H. M.....Adams
Baker, C. L.....Austin	Leck, C. C.....Austin	Torkelson, P. T.....Lyle
	Lomman, P. A.....Austin	Warren, C. L.....LeRoy

Dodge County Medical Society

No regular meetings
Annual meeting in August

President	Adams, Rollin T.....Mantorville	Clifford, Frank F.....West Concord
Harrison, E. E.....West Concord	Baker, Amos L.....Kasson	Harrison, Elmer E.....West Concord
Secretary	Belt, Wallace E.....Dodge Center	Smith, Frank D.....Kasson
Bigelow, C. E.....Dodge Center	Bigelow, Chas. E.....Dodge Center	Way, Osman F.....Claremont

Olmstead County Medical Society

Regular meetings, second Wednesday in April, June, September and December
Annual meeting, second Wednesday in December

President	Bonta, M. B.....Rochester	Heyersdale, Oscar C.....Rochester
Joyce, Geo. T.....Rochester	Boothby, Walter M.....Rochester	Howard, S. E.....Rochester
Secretary	Bownig, Harry H.....Rochester	Hundling, H. W.....Rochester
Piper, M. C.....Rochester	Braasch, Wm. F.....Rochester	Hunt, Verne C.....Rochester
Abrams, W. D.....Rochester	Bradley, E. L.....Rochester	Hutchinson, C. J.....Rochester
Adson, Alfred W.....Rochester	Gaarde, Fred. W.....Rochester	Hyer, C. A.....Rochester
Allen, Wilson A.....Rochester	Giffin, H. Z.....Rochester	Johnson, A. C.....Rochester
Amber, S.....Rochester	Goeckerman, W. H.....Rochester	Jopson, P. N.....Rochester
Anderson, C. N.....Rochester	Graham, Christopher.....Rochester	Jones, H. T.....Rochester
Andres, R. G.....Rochester	Granger, G. Booker.....Rochester	Joseph, E. G.....Rochester
Andrews, C. F.....Rochester	Granger, Charles T.....Rochester	Joyce, George.....Rochester
Anderson, F. W.....Rochester	Greenfield, W. J.....Rochester	Judd, Edward S.....Rochester
Asbury, J. T.....Rochester	Grigsby, R. O.....Rochester	Keith, N. M.....Rochester
Baird, E. A.....Rochester	Haines, S. F.....Rochester	Kilbourne, Arthur F.....Rochester
Baker, C. E.....Rochester	Hallberg, C. A.....Rochester	Brock, S.....Rochester
Balfour, Donald C.....Rochester	Hallenbeck, Dorr F.....Rochester	Broders, Albert C.....Rochester
Barlow, Roy A.....Rochester	Hardt, L. L.....Rochester	Brown, P. W.....Rochester
Baughn, H. A.....Rochester	Harrington, S. W.....Rochester	Brown, S. E.....Rochester
Benedict, Wm. L.....Rochester	Hartman, Howard R.....Rochester	Bryan, A. W.....Rochester
Berjamin, W. G.....Rochester	Hedblom, Carl A.....Rochester	Buie, Louis A.....Rochester
Berkman, David M.....Rochester	Helmholz, H. F.....Rochester	Bumpus, Herman C.....Rochester
Blanco, P.....Rochester	Hempstead.....Rochester	Busman, George W.....Rochester
Bleifus, Walter F.....Rochester	Henderson, Melvin S.....Rochester	Cathcart, E. P.....Rochester

Chaney, R. H. Rochester
 Chaney, W. C. Rochester
 Conner, H. M. Rochester
 Copenhagen, N. H. Rochester
 Crenshaw, John L. Rochester
 Crewe, John E. Rochester
 Culligan, J. M. Rochester
 DesBrisay, H. A. Rochester
 Desjardins, Arthur U. Rochester
 Drips, D. G. Rochester
 Dolder, Felix C. Eyota
 Doyle, J. B. Rochester
 Eager, B. F. Rochester
 Eusterman, George B. Rochester
 Evarts, Arrah B. Rochester
 Fardy, M. J. Rochester
 Fawcett, Charles E. Stewartsville
 Fineman, S. Rochester
 Fitz, R. Rochester
 Foucar, H. O. Rochester
 Fowler, L. H. Rochester
 Frazier, E. B. Rochester
 King, C. P. Rochester
 Kinsella, T. J. Rochester
 Knauf, A. R. Rochester
 Koons, K. M. Rochester
 Lange, A. E. Rochester
 Lemon, Willis S. Rochester
 Lillie, Harold L. Rochester
 Lillie, Walter I. Rochester
 Linton, Wm. B. Rochester
 Lippman, H. S. Rochester
 Logan, Archibald H. Rochester
 Long, W. H. Rochester
 Lynch, G. V. Rochester

Lyons, Horace R. Rochester
 McCartney, J. S. Minneapolis
 McCorvie, J. E. Rochester
 McGuire, L. D. Rochester
 Magath, T. B. Rochester
 Masson, James C. Rochester
 Masson, D. M. Rochester
 Mastin, Edward V. Rochester
 Mayo, Charles H. Rochester
 Mayo, W. J. Rochester
 Meeker, W. R. Rochester
 Melson, Oliver C. Rochester
 Meyerding, Henry W. Rochester
 Mitchell, J. I. Rochester
 Moersch, H. J. Rochester
 Moersch, Frederick P. Rochester
 Moore, T. D. Rochester
 Moore, Alex B. Rochester
 Murphy, L. T. Rochester
 Mussey, Robert D. Rochester
 New, Gordon B. Rochester
 Ohlinger, Lorin B. Rochester
 O'Leary, Paul A. Rochester
 Osborne, E. D. Rochester
 Ott, William Rochester
 Pardee, K. Rochester
 Parker, E. R. Rochester
 Parker, H. L. Rochester
 Pemberton, John deJ. Rochester
 Piper, Monte C. Rochester
 Plummer, H. S. Rochester
 Plummer, W. A. Rochester
 Pollock, Lee W. Rochester
 Powell, L. D. Rochester
 Prangen, Avery D. Rochester

Proctor, O. S. Rochester
 Rankin, F. W. Rochester
 Renshaw, K. Rochester
 Rice, G. E. Rochester
 Rockwell, D. C. Rochester
 Rosenow, Edward C. Rochester
 Ross, J. W. Rochester
 Rowley, Walter Rochester
 Rowntree, L. S. Rochester
 Russell, Herman R. Stewartsville
 Sanford, Arthur H. Rochester
 School, A. J. Rochester
 Schoonover, F. S. Rochester
 Senty, E. J. Rochester
 Sheldon, Walter D. Rochester
 Sistrunk, Walter E. Rochester
 Smith, F. L. Rochester
 Stacy, Leda June. Rochester
 Steven, George Byron
 Stokes, John H. Rochester
 Szlapla, T. L. Rochester
 Taylor, R. V. Rochester
 Vinson, Porter P. Rochester
 Wagoner, H. P. Rochester
 Walters, W. Rochester
 Weir, J. F. Rochester
 Wilder, Russel M. Rochester
 Wilhelm, L. F. X. Rochester
 Willius, Frederick A. Rochester
 Wilkins, J. A. Rochester
 Wilson, Louis B. Rochester
 Winter, M. D. Rochester
 Witherstine, H. H. Rochester
 Woltman, Henry W. F. Rochester
 Young, T. O. Rochester

Waseca County Medical Society

Annual meeting, December

President
 Lynn, J. F. Waseca
 Secretary
 Miller, H. A. Waseca
 Blanchard, H. G. Waseca

Brandenberg, F. D. New Richland
 Chamberlain, W. A. Waseca
 Cory, W. H. Waterville
 Hagen, H. O. New Richland
 Joyce, I. M. Janesville
 Gallagher, B. H. Waseca

Lynn, J. F. Waseca
 Miller, H. A. Waseca
 McIntire, H. M. Waseca
 O'Hara, J. J. Janesville
 Swartwood, F. A. Waseca

Winona County Medical Society

Regular meetings, first Tuesday in January, April, July, October

Annual meetings in January

President
 Lichtenstein, Hans Winona
 Secretary
 Robbins, C. P. Winona
 Benoit, R. F. Winona
 Clay, F. H. St. Charles
 Heise, W. F. C. Winona
 Keyes, E. D. Winona

Leicht, O. Winona
 Lester, C. A. Winona
 Lichtenstein, H. Winona
 Lindsay, W. V. Winona
 Lynch, J. L. Winona
 McLaughlin, E. M. Winona
 Nauth, W. W. Winona
 Neumann, C. A. St. Charles

Pritchard, D. B. Winona
 Risser, E. D. Winona
 Robbins, C. P. Winona
 Rosenberry, B. P. Winona
 Schaefer, S. Winona
 Scott, J. W. St. Charles
 Steiner, I. W. Winona
 Tweedy, G. J. Winona

Freeborn County Medical Society

Regular meetings upon call of members

Annual meeting, November

President
 Von Berg, J. P. Albert Lea
 Secretary
 Vollum, E. O. Albert Lea
 Burns, H. D. Albert Lea

Butruff, C. R. Freeborn
 Calhoun, F. W. Albert Lea
 Folken, G. F. Albert Lea
 Gullixson, A. Albert Lea
 Kamp, B. A. Albert Lea
 Nannestad, J. R. Albert Lea

Palmer, W. L. Albert Lea
 Shultz, J. A. Albert Lea
 Stevenson, R. G. Albert Lea
 Stewart, O. E. Albert Lea
 Vollum, E. O. Albert Lea
 Von Berg, J. P. Albert Lea

Steele County Medical Society

Regular meetings, first Tuesday of each month

Annual meetings in December

President
 Daily, W. J. Blooming Prairie
 Secretary
 Andrist, J. W. Owatonna
 Adair, J. H. Owatonna
 Andrist, J. W. Owatonna

Daily, W. J. Blooming Prairie
 Ertel, E. Q. Ellendale
 Hart, A. E. Owatonna
 Melby, B. Blooming Prairie
 Morehouse, G. G. Owatonna
 Peterson, C. Owatonna

Senn, E. W. Owatonna
 Smersh, F. M. Owatonna
 Smersh, J. F. Owatonna
 Stewart, A. B. Owatonna
 Thimsen, N. C. Blooming Prairie
 Warren, J. W. Minneapolis

ALPHABETICAL ROSTER

Aanes, A. M.....Red Wing
Abbott, J. S.....St. Paul
Abbott, Wm. P.....Duluth
Abbott, A. W.....Minneapolis
Aborn, W. H.....Hawley
Abramovich, J. H.....St. Paul
Abrams, W. D.....Rochester
Adair, F. L.....Minneapolis
Adair, J. H.....Owatonna
Adams, E. S.....Hibbing
Adams, R. C.....Bird Island
Adams, Rollin T.....Mantorville
Adkins, C. M.....Thief River Falls
Adson, Alfred W.....Rochester
Ahrens, A. E.....St. Paul
Ahrens, A. H.....St. Paul
Aitkens, H. B.....Le Sueur Center
Alden, J. F.....St. Paul
Aldes, Harry.....St. Paul
Aldrich, F. R.....Belview
Alexander, F. H.....St. Paul
Ailing, C. P.....Minneapolis
Allen, H. W.....Minneapolis
Allen, F. H.....Staples
Allen, A. W.....Austin
Allen, Mason.....St. Paul
Allen, Wilson A.....Rochester
Almquist, H. E.....Minneapolis
Allymer, A. L.....Minneapolis
Amber, S.....Rochester
Ancker, A. B.....St. Paul
Anderson, C. N.....Rochester
Anderson, H. C.....St. Paul
Anderson, Norman E.....Harmony
Anderson, J. V.....Red Wing
Anderson, F. W.....Rochester
Anderson, R. E.....Willmar
Anderson, A. E.....Minneapolis
Anderson, Arnt.....Minneapolis
Anderson, J. D.....Minneapolis
Anderson, James K.....Minneapolis
Andres, R. G.....Rochester
Andrews, C. F.....Rochester
Andrews, John W.....Mankato
Andrews, Roy N.....Mankato
Andrist, J. W.....Owatonna
Annis, H. B.....Minneapolis
Archibald, C. M.....Mahnommen
Arends, A. L.....St. Paul
Arey, H. C.....Excelsior
Arminen, K. V.....Duluth
Armstrong, J. M.....St. Paul
Arnold, E. W.....Adrian
Arnson, J. M.....Graceville
Arouni, Khalil.....St. Paul
Arzt, C. P.....St. Paul
Asbury, J. T.....Rochester
Atkins, G. L.....Jackson
Aune, Martin.....Minneapolis
Aurand, W. H.....Minneapolis
Aurness, P. A.....Minneapolis
Ausman, Carl F.....Paynesville
Austin, E. E.....Minneapolis
Avery, J. F.....Minneapolis
Ayers, G. T.....Ely

Babcock, F. M.....Northfield
Bacon, C. G.....Marshall
Bacon, H. P.....Milaca
Bacon, Knox.....St. Paul
Bacon, L. C.....St. Paul
Bacon, R. S.....Montevideo
Badeaux, G. I.....Brainerd
Bagley, W. R.....Duluth
Baier, Florence.....Minneapolis
Bailey, H. B.....Ceylon
Baird, B. A.....Rochester
Baker, A. C.....Fergus Falls
Baker, Amos L.....Kasson
Baker, C. L.....Austin
Baker, A. T.....Minneapolis
Baker, C. E.....Rochester
Baker, E. L.....Minneapolis
Baker, Harry A.....Minneapolis
Baker, Looe.....Minneapolis
Bakke, O. H.....Minneapolis
Balcom, G. G.....Lake Wilson
Balcome, F. E.....St. Paul
Baldwin, L. B.....Minneapolis
Baldwin, O. J.....Chisholm
Baldwin, W. P.....Stephen
Balfour, Donald C.....Rochester
Ball, C. R.....St. Paul
Balles, D. W.....Galveston, Tex.
Bank, H. E.....Minneapolis
Barfield, J. J.....Granite Falls
Barlow, Roy A.....Rochester
Barney, L. A.....Duluth
Barr, W. H.....Wells

Barner, Henry Adolph.....
Barron, Moses.....Minneapolis
Barry, L. W.....St. Paul
Barsness, Nellie.....St. Paul
Barten, E. R.....Minneapolis
Baskett, Geo. T.....St. Peter
Baskett, Olive T.....St. Peter
Bass, C. W.....Minneapolis
Bates, B.....Wheaton
Baughn, H. A.....Rochester
Baxter, S. H.....Minneapolis
Bayley, E. H.....Lake City
Beadie, W. D.....St. Paul
Beals, Hugh.....St. Paul
Beard, Archie.....Minneapolis
Beaty, James H.....St. Cloud
Beaudoux, Henry A.....Minneapolis
Beckley, F. L.....St. Paul
Beebe, W. L.....St. Cloud
Behmler, Fred W.....Lafayette
Beise, R. A.....Brainerd
Burns, M. A.....Milan
Burns, R. M.....St. Paul
Buscher, H.....St. Paul
Bushey, M. E.....Arlington
Busman, George W.....Rochester
Butler, John.....Minneapolis
Buttruff, C. R.....Freeborn
Butz, J. A.....Monterey
Byrnes, W. J.....Minneapolis
Bell, J. W., Jr.....Minneapolis
Bell, J. W., Sr.....Minneapolis
Belt, Wallace E.....Dodge Center
Benedict, Wm. L.....Rochester
Benham, Edward W.....Mankato
Benjamin, A. E.....Minneapolis
Benjamin, W. G.....Rochester
Benedict, E. E.....Minneapolis
Benn, F. G.....Minneapolis
Bennepe, L. M.....St. Paul
Bennion, P. H.....St. Paul
Benoit, R. F.....Winona
Benson, Geo. E.....Minneapolis
Benson, I. S.....Willmar
Benson, R. D.....Minneapolis
Bentley, Norman P.....St. Paul
Bergh, L. N.....Montevideo
Bergheim, M. C.....Hawley
Berkman, David M.....Rochester
Bernard, B. C.....Lake Park
Bergquist, K. E.....Duluth
Berrisford, Paul D.....St. Paul
Bertelson, O. L.....Crookston
Bessenes, A. N.....Minneapolis
Best, F. E.....Wells
Beyers, A. G.....Red Wing
Biederman, Jacob.....

Thief River Falls
Bigelow, Chas. E.....Dodge Center
Binet, H. E.....Grand Rapids
Binger, H. E.....St. Paul
Biorn, N. A.....Jackson
Birnberg, T. L.....St. Paul
Bishop, Chas. W.....Minneapolis
Bissell, F. S.....Minneapolis
Boyer, S. H.....Duluth
Black, William.....Mankato
Blake, James.....Hopkins
Blakely, C. C.....Barnum
Blanchard, H. G.....Waseca
Blanco, P.....Rochester
Blegen, H. M.....Warren
Bleifus, Walter F.....Rochester
Bock, R. A.....St. Paul
Rockman, M.....Minneapolis
Boeckmann, Eduard.....St. Paul
Boeckmann, Egil.....St. Paul
Boehm, John C.....St. Cloud
Bohland, E. H.....St. Paul
Bohling, B. S.....Sandstone
Bole, R. S.....St. Paul
Boleyn, E. S.....St. Paul
Bolsta, Chas.....Ortonville
Bolstad, H. C.....St. Paul
Bone, Merle.....Kelliher
Bong, J. H.....Jasper
Bonta, M. B.....Rochester
Booth, A. E.....Minneapolis
Boothby, Walter M.....Rochester
Boquist, E. T. W.....Minneapolis
Boreen, C. A.....Minneapolis
Borgeson, Egbert.....Hanska
Borreson, S.....Bemidji
Bossingham, O. N.....Lake Benton
Bosworth, Robinson.....St. Paul
Bottlfsen, B. T.....Moorhead
Bowers, H. E.....Lake City

Bowers, J. T.....Lake City
Bowman, H. A.....Minneapolis
Bowman, P. G.....Duluth
Bownig, Harry H.....Rochester
Boysen, P.....Pelican Rapids
Braasch, Wm. F.....Rochester
Brabec, F. J.....Perham
Braden, A. J.....Duluth
Bradley, E. L.....Rochester
Brand, G. D.....St. Paul
Brand, W. A.....Redwood Falls
Branderberg, F. D. New Richland
Branton, A. F.....Willmar
Branton, B. J.....Willmar
Branyan, Hugo.....Wabasha
Bratrud, Arthur F.....Minneapolis
Bratrud, E.....Warren
Bratrud, Theo.....Warren
Bray, C. W.....Biwabik
Bray, E. R.....St. Paul
Briggs, F. W.....Duluth
Brigham, Frank.....Watkins
Brimhall, J. B.....St. Paul
Broberg, J. A.....Blue Earth
Brock, S.....Rochester
Broders, Albert C.....Rochester
Brodie, Walter D.....St. Paul
Broker, W. S.....Minneapolis
Brooks, Chas. W.....Minneapolis
Brooks, D. F.....St. Paul
Brown, A. H.....Pipestone
Brown, Edwin D.....Minneapolis
Brown, Edw. I.....St. Paul
Brown, E. J.....Minneapolis
Brown, John C.....St. Paul
Brown, LeRoy.....St. Paul
Brown, Lyle L.....Crookston
Brown, Paul F.....Minneapolis
Brown, P. W.....Rochester
Brown, R. S.....Minneapolis
Brown, Silas E.....St. Paul
Brown, S. E.....Rochester
Browning, W. E.....Caledonia
Brunet, L. M.....Cloquet
Bryan, A. W.....Rochester
Buck, Fred H.....Shakopee
Buckley, E. W.....St. Paul
Buie, Louis A.....Rochester
Bulkey, Kenneth.....Minneapolis
Bullen, F. W.....Hibbing
Bumpus, Herman C.....Rochester
Burfiend, G. H.....St. Paul
Burch, F. E.....St. Paul
Burnap, W. L.....Fergus Falls
Burns, F. W.....St. Paul
Burns, H. D.....Albert Lea
Burns, H. J.....Duluth

Cabet, V. S.....Minneapolis
Caine, C. E.....Morris
Calhoun, F. W.....Albert Lea
Cameron, J. A.....St. Paul
Camp, Walter E.....Minneapolis
Campbell, A. A.....Ogema
Campbell, E. Paul.....St. Paul
Cawlaw, C. M.....Minneapolis
Campbell, J. E.....South St. Paul
Campbell, Lowell N.....Minneapolis
Campbell, Robert.....Minneapolis
Cannedy, Edw. W.....Prior Lake
Cannon, C. M.....St. Paul
Cannon, Harry.....St. Paul
Cantwell, W. F.....Little Fork
Carey, Jas. B.....Minneapolis
Carman, C. L.....St. Paul
Carman, Paul I.....St. Paul
Carmen, J. E.....Detroit
Carroll, Wm. C.....St. Paul
Carstons, C. F.....Hibbing
Cathcart, E. P.....Rochester
Catlin, John J.....Buffalo
Catlin, T. J.....Palisade
Cavanaugh, J. O.....St. Paul
Cavanor, F. T.....Minneapolis
Chadbourne, A. G.....Heron Lake
Chamberlain, W. A.....Waseca
Chambers, W. C.....Blue Earth
Chandler, O. B.....St. Paul
Chaney, R. H.....Rochester
Chaney, W. C.....Rochester
Chapman, T. L.....Duluth
Chatterton, C. C.....St. Paul
Cheleen, S. J.....Minneapolis
Cheney, E. L.....Duluth
Chowning, Wm.....Minneapolis
Christenson, C. R.....Morris
Christison, J. T.....St. Paul
Christiansen, A.....St. Paul
Christianson, H. W.....Wykoff

Christie, G. R. Long Prairie
Churchill, A. G. St. Paul
Cirkler, A. A. Minneapolis
Clair, J. B. Winsted
Clark, C. N. Galup, New Mexico
Clark, F. E. Duluth
Clark, G. E. Stillwater
Clark, Harry B. St. Cloud
Clark, Howard S. Minneapolis
Clark, Lenna E. Galup, New Mex.
Clark, T. C.
Soldiers' Home, Minneapolis
Clay, E. M. Renville
Clay, F. H. St. Charles
Clement, L. E. Red Wing
Clement, J. B. Lester Prairie
Clifford, Frank F. West Concord
Clifton, T. A. Isanti
Cobb, S. G. St. Paul
Cole, H. B. Redwood Falls
Cole, Wallace. St. Paul
Collie, H. G. St. Paul
Collins, A. N. Duluth
Collins, H. C. Duluth
Colvin, A. R. St. Paul
Comstock, A. E. St. Paul
Condit, W. N. Minneapolis
Conley, Alva. Cannon Falls
Conley, H. E. Cannon Falls
Conner, H. M. Rochester
Connor, C. E. St. Paul
Cook, H. W. Minneapolis
Cook, Paul B. St. Paul
Cooney, H. C. Princeton
Cooper, M. D. Winnebago City
Copenhaver, N. H. Rochester
Corbett, J. Frank. Minneapolis
Corrigan, J. E. Spooner
Corniea, A. D. St. Paul
Cory, W. H. Waterville
Cosgrove, J. H. Duluth
Courtney, Walter. Brainerd
Covell, W. W. St. Peter
Coventry, W. A. Duluth
Cowern, E. W. North St. Paul
Cowing, P. G. Evansville
Cozman, E. O. Minneapolis
Crafts, L. N. Minneapolis
Craig, C. C. International Falls
Crandall, A. N. Madison
Craumer, Richard R. Minneapolis
Crawl, Verne C. Bertha
Cremer, M. H. Red Wing
Crenshaw, John L. Rochester
Cress, E. E. Boyd
Cress, P. J. Ellsworth
Crewe, John E. Rochester
Cross, John G. Minneapolis
Crowe, J. H. Virginia
Crums, Geo. F. Minneapolis
Culligan, J. M. Rochester
Curtin, John F. Minneapolis
Cutts, Geo. Minneapolis
Cutts, G. A. C. Litchfield

Dack, L. G. St. Paul
Dahl, Elmer O. Minneapolis
Dahl, Gerhard A. Mankato
Dahl, John A. Minneapolis
Dahlstrom, A. W. Minneapolis
Daigault, O. Benson
Daily, W. J. Blooming Prairie
Dampier, C. E. Crookston
Daniel, Donald H. Minneapolis
Daniels, J. W. St. Peter
Daniels, W. H. Crookston
Danielson, K. A. Litchfield
Dans, F. L. Wadena
Darling, J. B. St. Paul
Darrow, C. C. Moorhead
Dart, L. D. Minneapolis
Daugherty, E. B. St. Paul
Daugherty, L. E. St. Paul
Davis, B. F. Duluth
Davis, F. U. Faribault
Davis, Herbert. St. Paul
Davis, H. S. Duluth
Davis, T. C. Glenwood
Davis, William. St. Paul
Davison, P. C. Willmar
De Boer, Herman. Edgerton
Dedolph, K. St. Paul
Dempsey, D. P. Kellogg
Denman, Austin V. Mankato
Dennis, W. A. St. Paul
DesBrisay, H. A. Rochester
Desjardins, Arthur U. Rochester
Dewey, G. W. Fairmont
Deziel, G. Minneapolis
Dickson, Thos. H., Jr. St. Paul
Disen, C. F. Minneapolis
Ditmeier, I. M. Gerber. Jasper
Dittman, Geo. C. St. Paul
Dodge, F. A. Le Sueur

Dohm, A. J. St. Paul
Dolan, C. P. Worthington
Dolder, Felix C. Eyota
Doms, H. C. Slayton
Donaldson, C. A. Minneapolis
Donavon, J. J. Litchfield
Doolittle, E. L. Duluth
Dorge, Richard. Minneapolis
Dornblaser, H. Bright Minneapolis
Douglas, H. E. Blackduck
Douglas, J. E. State Sanitorium
Doxey, G. L. Minneapolis
Doyle, J. B. Rochester
Drake, Carl B. St. Paul
Drake, F. A. Lanesboro
Drake, Chas. R. Minneapolis
Dredge, H. P. Sandstone
Drenning, F. C. Duluth
Driesbach, N. Minneapolis
Drips, D. G. Rochester
Drought, W. W. Fergus Falls
Dryden, F. M. Crookston
Dubbe, F. H. New Ulm
Du Bois, Julian A. Sauk Center
Du Bois, Julian F. Sauk Center
Duclos, J. A. Henderson
Dudley, J. H. Windom
Dulude, S. Dassel
Dunlop, Alex. Crookston
Dunn, Geo. Robert. Minneapolis
Dunn, J. B. St. Cloud
Dunn, J. N. St. Paul
Dunn, Lewis. Minneapolis
Dunsmoor, F. A. Minneapolis
Durgin, F. L. Nopeming
Dutton, E. C. Minneapolis

Earl, Geo. A. St. Paul
Earl, Robert C. St. Paul
Eager, B. F. Rochester
Eberlin, E. A. Glenwood
Eckstein, A. W. Comfrey
Edwards, Ralph T. Elysian
Egan, John M. Minneapolis
Eggen, O. K. Minneapolis
Egilsrud, Kristian. Minneapolis
Ehrenberg, C. J. Willmar
Eirley, Clara. Mt. Pleasant, Ia.
Eisengraber, G. A. Granite Falls
Eisenman, W. F. Chisholm
Eisler, Edwin R. Minneapolis
Eitel, G. G. Minneapolis
Ekblad, J. W. Duluth
Eklund, J. J. Duluth
Eklund, W. J. Duluth
Elias, F. J. Duluth
Elleson, Frank. Monticello
Elsey, J. R. Glenwood
Ely, O. S. South St. Paul
Erb, Fred A. Minneapolis
Engberg, E. J. St. Paul
Engb, Sigfred. Cottonwood
Ericson, John G. Minneapolis
Erickson, W. A. Faribault
Ernest, G. C. St. Paul
Ertel, E. Q. Ellendale
Eshelby, E. C. St. Paul
Esser, John. Perham
Estrem, C. O. Fergus Falls
Eusterman, George B. Rochester
Evarts, Arah B. Rochester
Everlof, J. L. Minneapolis
Evert, John A. St. Paul
Ewing, C. F. Wheaton

Fahey, E. W. Duluth
Fankboner, A. V. Motley
Fansler, W. A. Minneapolis
Fardy, M. J. Rochester
Farr, R. E. Minneapolis
Farrage, J. H. Winnebago City
Fawcett, Charles E. Stewartville
Feidt, W. W. Minneapolis
Ferguson, J. B. St. Paul
Ferguson, J. C. St. Paul
Fields, Martin. Northfield
Fineman, S. Rochester
Fischer, G. Minneapolis
Fischer, H. P. Shakopee
Fischer, O. F. Houston
Fischer, P. M. Shakopee
Fisher, L. F. Thief River Falls
Fitz, R. Rochester
Fitzgerald, D. Minneapolis
Fitzgerald, E. T. Morris
Fjellman, R. C. Minneapolis
Fjelstad, C. Alford Minneapolis
Fleischhauer, D. S. Wabasha
Fleming, A. S. Minneapolis
Fleming, J. Cloquet
Flinn, B. P. Redwood Falls
Flinn, T. E. Redwood Falls
Flocken, Chas. F. Minneapolis

Flom, A. O. Chisago City
Flower, W. Z. Minneapolis
Fogarty, C. W. St. Paul
Folken, G. F. Albert Lea
Forbes, R. S. Duluth
Forrest, C. G. Clearbrook
Foster, B. W. Spring Valley
Foucar, H. O. Rochester
Fowler, L. H. Rochester
Fox, John M. Minneapolis
Franchere, F. W. Lake Crystal
Franzen, H. C. Minneapolis
Frasier, Geo. W. Duluth
Frazier, E. B. Rochester
Freeborn, J. A. Fergus Falls
Freed, O. J. R. Kokato
Freeman, C. D. St. Paul
Freeman, W. L. Foley
Freligh, E. O. B. Stillwater
French, H. S. Grove City
Frieck, Frank P. Gibbon
Friesleben, Wm. Sauk Rapids
Froelich, H. W. Thief River Falls
Frost, E. H. Willmar
Fulton, J. F. St. Paul
Furber, W. W. Cottage Grove

Gaarde, Fred W. Rochester
Gager, E. C. St. Paul
Gaines, E. C. Buffalo Lake
Gallagher, B. H. Waseca
Gardner, E. L. Minneapolis
Garlock, A. V. Bemidji
Gates, J. A. Kenyon
Gauthier, W. Virginia
Geer, Everett K. St. Paul
Geissinger, John D. St. Paul
Geist, Emil. Minneapolis
Geist, Geo. A. St. Paul
Gelz, John J. Richmond
Gendron, J. F. Grand Rapids
Germo, Chas. Balaton
Ghent, Harry. St. Paul
Ghent, M. M. St. Paul
Ghostley, Mary. Internatl Falls
Gibbon, L. L. Lowry
Giere, E. O. St. Paul
Glessler, Paul W. Minneapolis
Giffin, H. Z. Rochester
Gilbert, J. R. Carlton
Gilfillan, J. S. St. Paul
Gilkinson, A. J. Osakis
Gilles, L. L. Minneapolis
Gillespie, N. H. Duluth
Gilmore, R. Bemidji
Ginsberg, Wm. St. Paul
Glyer, R. T. Brooten
Goeckerman, W. H. Rochester
Goehrs, H. W. St. Cloud
Goldberg, M. L. Jasper
Golden, C. M. Tyler
Goltz, E. V. St. Paul
Goodman, C. E. Virginia
Gordon, G. J. Minneapolis
Gosin, D. F. Minneapolis
Goss, Harold J. Rochester
Gosslee, G. L. Moorhead
Gotham, C. L. St. Paul
Gowdy, R. A. Alexandria
Graham, Christopher. Rochester
Graham, David. Duluth
Graham, Reginald. Duluth
Graham, Robert. Duluth
Granger, Charles T. Rochester
Granger, G. Booker. Rochester
Gratzek, Thos. St. Paul
Graves, C. Aitkin
Graves, Floyd. Minneapolis
Grawn, F. A. Duluth
Gray, Clyde E. Rush City
Gray, F. D. Marshall
Greely, L. Q. Duluth
Green, E. K. Minneapolis
Greene, C. L. St. Paul
Greenfield, W. J. Rochester
Griffin, P. J. Fertile
Grigsby, R. O. Rochester
Grimes, H. B. Madella
Grise, W. B. Austin
Groll, S. Minneapolis
Ground, H. T. Virginia
Gruenhagen, Arnold P. St. Paul
Guilford, H. M. Rochester
Gulde, W. C. St. Cloud
Gullixson, A. Albert Lea
Gunderson, Harley J. Minneapolis
Gunderson, R. M. Lake Park
Guyer, L. G. Waseca

Hacking, Frank. Minneapolis
Haessley, S. B. Faribault
Hagaman, Geo. K. St. Paul
Hagen, G. L. Minneapolis
Hagen, H. O. New Richland

Hagen, O. E. Butterfield
Hagen, O. J. Moorhead
Haggard, G. D. Minneapolis
Haight, G. G. Audubon
Haines, J. H. Stillwater
Haines, S. F. Rochester
Halenback, P. L. Crosby
Hall, A. R. St. Paul
Hall, A. E. Cusson
Hall, J. N. Minneapolis
Hall, P. M. State Sanatorium
Hallberg, C. A. Rochester
Hallenbeck, Dorr F. Rochester
Halloran, Walter. Jackson
Hallowell, W. H. Minneapolis
Hamel, Arnold L. Minneapolis
Hamel, C. F. Minneapolis
Hamilton, A. S. Minneapolis
Hammermeister, Theo. F.
New Ulm
Hammes, E. M. St. Paul
Hammond, J. F. St. Paul
Hand, W. R. Elbow Lake
Haney, C. L. Duluth
Hansen, Erling. Minneapolis
Hanson, A. M. Faribault
Hanson, H. J. New London
Hanson, H. V. Willmar
Hanson, Olga. Minneapolis
Hardt, L. L. Rochester
Hare, E. R. Minneapolis
Harriman, L. Howard Lake
Harrington, C. D. Minneapolis
Harrington, S. W. Rochester
Harrison, Elmer E. West Concord
Hart, A. B. Owatonna
Hartig, Hugo J. Minneapolis
Hartman, Howard R. Rochester
Hartung, H. A. Le Sueur
Hartzell, Thos. B. Minneapolis
Haskell, A. D. Alexandria
Haskins, J. L. Morgan
Hathaway, S. J. Minneapolis
Haugen, G. T. Fergus Falls
Haugen, O. N. Fergus Falls
Haverfield, Addie B. Minneapolis
Hawkins, E. P. Montrose
Hawkins, V. J. St. Paul
Hayes, J. M. Minneapolis
Hayes, M. F. Nashauk
Haynes, F. E. Minneapolis
Head, G. D. Minneapolis
Heath, A. C. St. Paul
Healy, R. F. Pierz
Hearn, Wm. O. Minneapolis
Hedback, A. E. Minneapolis
Hedblom, Carl A. Rochester
Hedding, J. A. Minneapolis
Hegge, C. A. Austin
Hegge, O. H. Austin
Heibert, J. P. Minneapolis
Heim, R. R. Minneapolis
Helmark, Jacob H. Moorhead
Helmholz, H. F. Rochester
Helmark, O. E. Duluth
Heise, W. F. C. Winona
Helland, G. W. Spring Grove
Helland, J. W. Spring Grove
Helk, H. H. Minneapolis
Hempstead, B. E. Rochester
Hempstead, Werner. St. Cloud
Henderson, A. G. Kiester
Henderson, Melvin S. Rochester
Hendrickson, J. F. Minneapolis
Hengstler, W. H. St. Paul
Henriksen, H. G. New Market
Henry, C. E. Minneapolis
Hensel, C. N. St. Paul
Henslin, A. E. LeRoy
Herman, S. Welcome
Herrmann, E. T. St. Paul
Hertel, G. A. Austin
Heseltine, V. G. Taylors Falls
Hesselgrave, S. S. St. Paul
Heyesdale, Oscar. Rochester
Higgins, J. H. Minneapolis
Hilger, A. W. St. Paul
Hilger, D. D. St. Paul
Hilger, J. M. Iona
Hilger, L. A. St. Paul
Hill, Eleanor J. Minneapolis
Hill, R. J. Minneapolis
Hirschboeck, F. J. Duluth
Hirschfield, Adolph. Minneapolis
Hirschfield, M. S. Duluth
Hitchings, W. P. Lakefield
Hobbs, C. A. Minneapolis
Hodge, S. V. Minneapolis
Hodgson, H. H. Crookston
Hoegh, Knut. Minneapolis
Hoff, Alfred. St. Paul
Hoff, Peder A. St. Paul
Hoffman, J. Henning
Hoidale, A. F. Tracy

Hoiland, A. S. Argyle
Hoit, E. E. Detroit
Holbrook, John S. Mankato
Holcomb, J. P. St. Paul
Holcomb, O. W. St. Paul
Holdridge, G. A. Foley
Holen, T. Minneapolis
Holl, P. M. Minneapolis
Holley, Wallace W. Warren
Holm, Geo. A. Minneapolis
Holman, Carl J. Mankato
Holman, E. E. Pine River
Holmberg, L. J. Canby
Holmes, W. B. Ada
Holst, C. F. Little Falls
Holst, J. B. Little Falls
Holte, Halvor. Crookston
House, L. E. Cass Lake
Houston, C. A. Park Rapids
Hovde, H. Duluth
Howard, S. E. Rochester
Howard, W. S. St. Paul
Howe, A. W. Minneapolis
Huenekens, E. J. Minneapolis
Hunt, F. N. Fairmont
Hughes, L. D. Minneapolis
Hullsiek, H. E. St. Paul
Hulshcher, Julian A. Mankato
Humphrey, E. W. Moorhead
Hundling, H. W. Rochester
Humphrey, W. R. Stillwater
Hunt, H. E. St. Paul
Hunt, R. C. Fairmont
Hunt, Verne C. Rochester
Hunte, A. F. Truman
Hursh, M. H. Grand Rapids
Hutchinson, C. J. Rochester
Huxley, E. R. Faribault
Hvoslef, Jacob. Minneapolis
Hyer, C. A. Rochester
Hynes, James. Minneapolis
Hynes, John E. Minneapolis
Ide, Arthur W. St. Paul
Ikeda, Kano. Minneapolis
Irvine, H. G. Minneapolis
Jacobs, A. C. Elmore
Jacobs, Jno. C. Willmar
Jacquato, G. L. Tyler
James, John H. Mankato
Jamieson, Earl. Walnut Grove
Jarvis, B. W. Minneapolis
Jellison, E. R. New Auburn
Jensen, J. C. Hendricks
Jensen, M. J. Minneapolis
Jensen, T. J. Duluth
Jesion, J. W. St. Paul
Johnson, A. C. Rochester
Johnson, A. E. Minneapolis
Johnson, A. E. Red Wing
Johnson, A. E. Minneapolis
Johnson, Asa M. St. Paul
Johnson, Carl E. Minneapolis
Johnson, C. M. Dawson
Johnson, Ellsworth. Windom
Johnson, E. W. Bemidji
Johnson, Geo. L. New Folden
Johnson, H. Kerkhoven
Johnson, H. M. Dawson
Johnson, H. P. Fairmont
Johnson, Hartland C. St. Paul
Johnson, James. Minneapolis
Johnson, Julius. Minneapolis
Johnson, Morton T. Minneapolis
Johnson, Nimrod A. Minneapolis
Johnson, Odin J. Minneapolis
Johnson, O. V. Sebeka
Johnson, R. A. Minneapolis
Johnson, T. H. St. Paul
Jones, A. W. Red Wing
Jones, E. M. St. Paul
Jones, H. T. Rochester
Jones, H. W. Minneapolis
Jones, R. N. Gaylord
Jones, W. A. Minneapolis
Jopson, P. N. Rochester
Joseph, E. G. Rochester
Josewich, Alexander. Minneapolis
Joyce, I. M. Janesville
Joyce, George. Rochester
Judd, Edward S. Rochester
Judson, W. E. Duluth
Kabrick, O. A. Odin
Kahala, Arthur. Crookston
Kalinfoff, D. Stillwater
Kamp, B. A. Albert Lea
Kannary, E. L. St. Paul
Kanne, C. W. Faribault
Karn, B. R. Ortonville
Kaufman, Wm. C. Appleton
Kean, N. D. Coleraine
Keating, Herman. St. Paul

Keeling, F. L. Lakefield
Keisling, I. H. Hibbing
Keith, N. M. Rochester
Kelly, B. W. Aitkin
Kelly, John V. St. Paul
Kelly, Paul H. St. Paul
Kelsey, C. G. Hinckley
Kemp, Alphonse F. Mankato
Kennedy, C. C. Minneapolis
Kennedy, James. Minneapolis
Kennedy, R. R. Minneapolis
Kenyon, Paul. Wadena
Kern, M. J. St. Cloud
Kerrick, Stanley E. Minneapolis
Keyes, C. R. Duluth
Keyes, E. D. Winona
Kibbe, O. A. Canton
Kierland, P. E. Harmony
Kilbourne, Arthur F. Rochester
Kilbride, J. S. Canby
Kimball, H. H. Minneapolis
King, C. P. Rochester
King, E. A. Minneapolis
King, Walter E. St. Paul
King, W. R. Minneapolis
King, Wm. S. Eveleth
Kinsella, T. J. Rochester
Kirk, G. P. E. Grand Forks
Kirmse, Geo. W. Minneapolis
Kirsch, R. L. Crookston
Kistler, C. M. Minneapolis
Kistler, J. M. Minneapolis
Kittelson, Theo. N. Fergus Falls
Kjelland, J. S.
East Ellsworth, Wis.
Klein, H. N. St. Paul
Klein, H. Duluth
Knauf, A. R. Rochester
Knauff, N. K. St. Paul
Knickerbocker, V. H. Staples
Knight, H. L. Minneapolis
Knight, R. R. Minneapolis
Knight, Ralph T. Minneapolis
Knights, F. A. Pequot
Knights, S. G. Randall
Koch, John C. Minneapolis
Kohlby, C. O. Duluth
Kohler, F. G. Hector
Kohler, Geo. A. Minneapolis
Koller, H. M. Minneapolis
Koller, L. R. Minneapolis
Kolset, Carl D. Benson
Koons, K. M. Rochester
Kraft, P. Duluth
Kramer, G. B. St. Paul
Kremer, Walter J. Minneapolis
Kriedt, Daniel. Minneapolis
Kucera, Wm. J. Hopkins
Kuhlman, Aug. Melrose
Kusske, A. L. Minneapolis
Kuth, J. R. Duluth
Kvitrud, G. St. Paul
Laird, A. T. Nopeming
LaJoie, John M. Minneapolis
Lamb, Harold L. Sauk Center
Lande, F. G. Stillwater
Landenberger, John. New Prague
Lane, Laura A. Minneapolis
Laney, R. L. Puporsky
Lange, A. E. Rochester
Langenderfer, F. V. St. Paul
Lannin, J. C. Mabel
La Pierre, C. A. Minneapolis
Larsen, C. L. St. Paul
Larson, O. O. Detroit
Laughlin, J. T. Grey Eagle
Laurent, A. A. Minneapolis
LaVake, R. T. Minneapolis
Law, A. A. Minneapolis
Leahy, B. St. Paul
Leavenworth, R. O. St. Paul
Leavitt, H. H. Minneapolis
Lebowske, Jos. A. Minneapolis
Leck, C. C. Austin
Le Clerc, J. E. Le Sueur
Lee, John W. Minneapolis
Lee, Thos. G. Minneapolis
Lee, W. A. Fergus Falls
Lee, W. N. Madison
Lee, W. P. Northfield
Leebens, J. H. Lismore
Leicht, O. Winona
Leigh, H. J. Lakefield
Leitch, Archibald. St. Paul
Leland, J. T. Herman
Leland, M. N. Minneapolis
Lemon, Willis S. Rochester
Lemstrom, Jarl. Minneapolis
Lenott, C. B. Virginia
Lepak, F. J. Duluth
Lepak, John A. St. Paul
Lerche, William. St. Paul
Lester, C. A. Winona

Leuty, Amos.....Morris
 Lewis, A. J.....Henning
 Lewis, C. R.....St. Cloud
 Lewis, E. J.....Sauk Center
 Lewis, J. B.....South St. Paul
 Lewis, J. D.....Minneapolis
 Lewis, W. W.....St. Paul
 Lexa, F. J.....Lonsdale
 Lichtenstein, H.....Winona
 Lick, C. Louis.....St. Paul
 Liebold, H. H.....Parkers Prairie
 Liedloff, Adolph G.....Mankato
 Lillie, Harold L.....Rochester
 Lillie, Walter I.....Rochester
 Lima, Ludwig.....Montevideo
 Lind, C. J.....Minneapolis
 Linde, Herman.....Cyrus
 Lindgren, E. I.....Duluth
 Lindsay, W. V.....Winona
 Linnehan, N. L.....Duluth
 Linner, H. P.....Minneapolis
 Linton, Wm. B.....Rochester
 Lippman, H. S.....Rochester
 Litchfield, John.....Minneapolis
 Little, W. J.....St. Paul
 Litzenberg, J. C.....Minneapolis
 Lloyd, Hiram J.....Mankato
 Locken, O. E.....Crookston
 Logan, Archibald H.....Rochester
 Logan, F. W.....Blue Earth
 Logefiel, Rudolph.....Minneapolis
 Lomman, P. A.....Austin
 Long, Jesse.....Minneapolis
 Long, W. H.....Rochester
 Looftbourrow, E. H.....Keewatin
 Loomis, E. A.....Minneapolis
 Love, Fred A.....Carlos
 Love, Geo. A.....Preston
 Lowe, L. M.....Glyndon
 Lowe, Thos.....Pipestone
 Lowe, Thos. A.....Pipestone
 Luedtke, G. H.....Fairmont
 Lufkin, H. M.....St. Paul
 Lum, C. E.....Duluth
 Lundgren, A. C.....Minneapolis
 Lundholm, A. M.....St. Paul
 Lynam, F.....Duluth
 Lynch, G. V.....Rochester
 Lynch, J. L.....Winona
 Lynch, N. J.....Minneapolis
 Lyng, John.....Minneapolis
 Lynn, J. F.....Waseca
 Lyon, J. D.....Minneapolis
 Lyons, Horace R.....Rochester
 Lysne, Henry.....Minneapolis

MacDonald, D. A.....Minneapolis
 MacLaren, Archibald.....St. Paul
 McAuliffe, J. A.....Duluth
 McCann, D. F.....Bemidji
 McCarthy, Donald.....Minneapolis
 McCarthy, Paul D.....Babitt
 McCarthy, W. J.....Madelia
 McCarthy, W. R.....St. Paul
 McCartney, J. S.....Minneapolis
 McClanahan, J. H.....White Bear
 McClanahan, T. S.....White Bear
 McCloud, C. N.....St. Paul
 McComb, C. F.....Duluth
 McCormick, Thos. F.....St. Paul
 McCornie, J. E.....Rochester
 McCoy, J. E.....Ivanhoe
 McCoy, Mary.....Duluth
 McCrea, Jas.....Fulda
 McDaniel Oriana.....Minneapolis
 McDavitt, Thomas.....St. Paul
 McDermott, T. E.....Minneapolis
 McDonald, A. F.....Minneapolis
 McDonald, A. L.....Duluth
 McDonald, H. H.....Minneapolis
 McDonald, I. C.....Minneapolis
 McDougald, D. W.....Le Sueur
 McDowell, J. P.....St. Cloud
 McEachran, A.....Minneapolis
 McFarland, Arthur H.....

Minneapolis

McGiffert, E. N.....Duluth
 McGroarty, J. J.....Easton
 McGuigan, H. T.....Red Wing
 McGuire, L. D.....Rochester
 McHaffie, O. L.....Duluth
 McHugh, R.....Aitkin
 McIntire, H. M.....Waseca
 McIntyre, E. H.....Virginia
 McIntyre, Geo.....Minneapolis
 McKeon, Owen.....St. Paul
 McKeown, E. G.....Pipestone
 McKibben, W. E.....St. Cloud
 McKinney, F. S.....Minneapolis
 McLaren, Jeanette M.....St. Paul
 McLaughlin, E. M.....Winona
 McLaughlin, James A.....
 Minneapolis
 McNevin, C. F.....St. Paul

McPheeters, N. O.....Minneapolis
 Macnie, John.....Minneapolis
 Maertz, W. F.....New Prague
 Magath, T. B.....Rochester
 Magie, W. H.....Duluth
 Magney, F. H.....Duluth
 Magnuson, Herman V.....Bell, Cal.
 Maikan, M. H.....Fairmont
 Maland, D. O.....Minneapolis
 Maloney, T. J.....St. Paul
 Manley, J. R.....Duluth
 Mann, A. T.....Minneapolis
 Manson, F. M.....Worthington
 Marcey, W. J.....Minneapolis
 Maquire, Leo.....Minneapolis
 Marcum, E. H.....Bemidji
 Mariette, E.....Minneapolis
 Mark, Arthur E.....St. Paul
 Mark, D. E.....Minneapolis
 Martin, E. T.....Marble
 Martin, T. R.....Duluth
 Martineau, J. L.....St. Paul
 Masson, D. M.....Rochester
 Masson, James C.....Rochester
 Mastin, Edward V.....Rochester
 Mathews, Justus.....Minneapolis
 Mattill, P. M.....Chisholm
 Maurer, E. L.....Brownton
 Maxeiner, Stanley R.....Minneapolis
 May, C. C.....Adrian
 May, C. E.....Minneapolis
 May, W. H.....Minneapolis
 Mayland, M. L.....Faribault
 Mayo, Charles H.....Rochester
 Mayo, W. J.....Rochester
 Mead, Marion A.....Minneapolis
 Mee, P. H.....Osseo
 Meckstroth, C. N.....Brandon
 Meeker, W. R.....Rochester
 Meierding, Wm. A.....Springfield
 Meighen, J. W.....Ulen
 Meland, O. N.....Warren
 Melby, B.....Bloomington
 Melby, O. F.....Thief River Falls
 Melson, Oliver C.....Rochester
 Melzer, G. R.....Lyle
 Merkert, G. L.....Minneapolis
 Merriman, L. L.....Duluth
 Merrill, James E.....Amboy
 Mesker, G. H.....Olivia
 Metcalf, F. W.....Worthington
 Metcalf, J. N.....Monticello
 Meyer, E. L.....Minneapolis
 Meyerding, E. A.....St. Paul
 Meyerding, Henry W.....Rochester
 Meyers, Thos.....St. Paul
 Michael, J. G.....Minneapolis
 Michaelson, H. E.....Minneapolis
 Michaelson, Henry E.....

Minneapolis

Miller, F. C.....Minneapolis
 Miller, H. A.....Waseca
 Miller, Victor.....Mankato
 Miller, W. A.....New York Mills
 Millsbaugh, J. G.....Little Falls
 Mingo, F. E.....Hugo
 Mitchell, Frederick.....St. Paul
 Mitchell, J. L.....Rochester
 Moersch, Frederick P.....Rochester
 Moersch, H. J.....Rochester
 Moffatt, A. G.....Howard Lake
 Mogilner, S. N.....St. Paul
 Moir, Wm. W.....Minneapolis
 Molander, H. A.....St. Paul
 Moloney, G. R.....Belle Plaine
 Molzahn, Herman E.....St. Paul
 Monahan, J. A.....Minneapolis
 Moore, Alex. B.....Rochester
 Moore, T. D.....Rochester
 Moorehead, M. E.....Minneapolis
 Mork, B. O.....Worthington
 More, C. W.....Eveleth
 Morehouse, G. G.....Owatonna
 Morell, W. N.....Verndale
 Moren, Ed.....Minneapolis
 Morley, G. A.....Crookston
 Morris, E. H.....Austin
 Morris, R. Edwin.....St. Paul
 Morrison, A. W.....Minneapolis
 Morrissey, F. B.....St. Paul
 Morse, C. R.....Hibbing
 Morse, John H.....Minneapolis
 Morse, M. P.....Le Roy
 Morse, W. E. H.....Morristown
 Morsman, C. F.....Hibbing
 Mortensen, N. G.....St. Paul
 Morton, H. McL.....Minneapolis
 Moses, Joseph, Jr.....Northfield
 Moynihan, And. F.....Sauk Center
 Movnihan, T. J.....St. Paul
 Mulder, John L.....Cavalier, N. D.
 Murphy, E. F.....St. Paul
 Murphy, I. J.....Minneapolis
 Murphy, L. T.....Rochester

Murray, D. D.....Duluth
 Murray, Wm. R.....Minneapolis
 Mussey, Robert D.....Rochester
 Myers, J. A.....Minneapolis

Naegeli, Frank.....Fergus Falls
 Nannestad J. R.....Albert Lea
 Nass, H. A.....Mabel
 Nauth, W. W.....Winona
 Neher, F. H.....St. Paul
 Nelson, C. A.....Owatonna
 Nelson, E. H.....Chisholm
 Nelson, H. E.....Crookston
 Nelson, H. S.....Minneapolis
 Nelson, M. S.....Spring Grove
 Nelson, Nesmith.....Brainerd
 Nelson, N. A.....Dawson
 Nelson, L. A.....St. Paul
 Nelson, O. E.....Minneapolis
 Nelson, O. N.....Battle Lake
 Nerad, A. H.....Argyle
 Neumann, C. A.....St. Charles
 New, Gordon B.....Rochester
 Newhart, Horace.....Minneapolis
 Newman, G. A.....Stillwater
 Nichols, A. E.....St. Paul
 Nicholson, Jos.....Brainerd
 Nicholson, M. A.....Duluth
 Niesbaum, W. H.....Jackson
 Nippert, H. T.....St. Paul
 Nippert, L. A.....Minneapolis
 Nixon, Chas. E.....Minneapolis
 Noice, Russell R.....Minneapolis
 Noonan, Dan F.....Minneapolis
 Noran, A. N.....Minneapolis
 Nordin, C. G.....Brainerd
 Nordin, G. T.....Minneapolis
 Nordland, Martin.....Minneapolis
 Norman, J. F.....Crookston
 Norris, E. H.....St. Paul
 Noth, H. W.....Minneapolis
 Novak, Edw. E.....New Prague
 Nye, Katherine A.....St. Paul

O'Brien, H. J.....St. Paul
 O'Connor, D. C.....Eden Valley
 O'Donnell, D. M.....Ortonville
 O'Donnell, J. E.....Minneapolis
 O'Hara, J. J.....Janesville
 O'Leary, Paul A.....Rochester
 Oberg, C. M.....Minneapolis
 Oerting, Harry.....St. Paul
 Ogden, B. H.....St. Paul
 Ohage, Justus, Jr.....St. Paul
 Ohlinger, Lorin B.....Rochester
 Oliver, C. L.....Graceville
 Ohnstad, J.....McIntosh
 Olson, Chas. A.....St. Paul
 Olson, Frederick A.....Minneapolis
 Olson, G. M.....Minneapolis
 Olson, O. H.....Erskine
 Olson, Olaf A.....Minneapolis
 Olson, R. G.....Minneapolis
 Olson, W. P.....Gaylord
 Onsgard, C. K.....Halstad
 Onsgard, L. K.....Houston
 Opheim, O. V.....Starbuck
 Oppegard, M. O.....Crookston
 Oredson, O. A.....Duluth
 Orton, H. N.....Minneapolis
 Osborn, Lida.....Mankato
 Osborne, E. D.....Rochester
 Osburn, Burt O.....Internat'l Falls
 Ostergren, E. W.....St. Paul
 Otto, H. C.....Frazee
 Ott, William.....Rochester
 Overend, K. S.....Hallowell
 Owre, Oscar.....Minneapolis

Pake, S. G.....Duluth
 Palmer, W. L.....Albert Lea
 Paradine, J.....Duluth
 Pardee, K.....Rochester
 Pare, L. T.....Duluth
 Parker, B. R.....Rochester
 Parker, E. H.....Minneapolis
 Parker, H. L.....Rochester
 Parker, O. W.....Ely
 Parks, A. H.....Minneapolis
 Parrott, B. W.....Long Prairie
 Parsons, Geo. E.....Elk River
 Passer, A. A.....Olivia
 Patterson, C. H.....Barnesville
 Patterson, W. E.....Minneapolis
 Patterson, W. L.....Fergus Falls
 Patterson, W. E.....Westbrook
 Paulson, C. W.....North Branch
 Paulson, E. L.....Minneapolis
 Paulson, Theo.....Fergus Falls
 Payette, C. H.....Duluth
 Pearce, N. O.....Minneapolis
 Pearson, F. R.....St. Paul
 Pedersen, A. H.....St. Paul
 Pederson, R. M.....Minneapolis

land, F. J. New Ulm
 Amberton, John de J. Rochester
 Angelly, E. J. Ironton
 Anhall, F. W. Morton
 Annie, D. F. Duluth
 Appard, T. A. Minneapolis
 Arkins, John W. Sanborn
 Arry, C. G. St. Paul
 Arry, Ralph St. John. Minneapolis
 Arsons, C. E. Marshall
 Arterson, Alfred. Dassel
 Arterson, C. Owatonna
 Arterson, H. E. Granite Falls
 Arterson, J. R. Minneapolis
 Arterson, O. N. Minneapolis
 Arterson, R. A. Vesta
 Arters, R. M. Minneapolis
 Arterson, Thorvald. Minneapolis
 Arterson, V. N. St. Paul
 Attit, C. W. Minneapolis
 Ayton, Wm. L. Minneapolis
 Aelps, A. E. Ogilvie
 Aelps, Kenneth A. Minneapolis
 Aelps, R. M. St. Peter
 Aillips, A. E. Delano
 Aillips, J. G. Northfield
 Aillips, Wm. H. Jordan
 Arce, Alias H. Wadena
 Aron, P. C. Paynesville
 Aron, Auten A. St. Paul
 Arneo, W. P. Minneapolis
 Arper, Monte C. Rochester
 Arper, Wm. A. Mountain Lake
 Artt, J. J. St. Paul
 Arndke, F. J. St. Paul
 Aronske, C. J. Faribault
 Arummer, H. S. Rochester
 Arummer, W. A. Rochester
 Aruehr, F. T. Minneapolis
 Arrier, J. A. Forest Lake
 Arlock, Lee W. Rochester
 Arlo, Daniel. St. Paul
 Arppe, F. H. Minneapolis
 Arptman, W. C. Jackson
 Arwell, L. D. Rochester
 Arwers, F. W. Barrett
 Arangen, Avery D. Rochester
 Aratt, Chelsea C. Mankato
 Aratt, Fred J. Minneapolis
 Aratt, J. A. Minneapolis
 Araine, Irvin A. Minneapolis
 Arim, J. A. Minneapolis
 Aritchard, D. B. Winona
 Arctor, O. S. Rochester
 Aruffer, F. L. Bird Island
 Arutney, Geo. W. Paynesville
 Aruinby, Thos. F. Minneapolis
 Aruist, Henry W. Minneapolis
 Aradquist, C. S. Hibbing
 Aradabaugh, R. C. Hastings
 Aralaha, J. Virginia
 Arains, John M. Willmar
 Araiter, Franklin W. S. Cloquet
 Aramsey, W. R. St. Paul
 Aranson, L. M. Hancock
 Arankin, A. A. Zumbro Falls
 Arankin, F. W. Rochester
 Aratchliffe, J. J. Aitkin
 Arathburn, A. M. Rice
 Arathburn, C. A. Sauk Rapids
 Aravu Bjarne. Minneapolis
 Arsed, Chas. E. Minneapolis
 Arses, S. P. Minneapolis
 Arvee, E. T. Elbow Lake
 Arvees, C. F. Eagle Bend
 Arlmer, E. W. Breckenridge
 Arlter, H. W. Shakopee
 Arnshaw, K. Rochester
 Arnplogle, W. H. Wabasha
 Arnolds, H. Hibbing
 Arnolds, J. S. Minneapolis
 Arce, G. D. St. Cloud
 Arce, G. E. Rochester
 Arichards, E. T. F. St. Paul
 Arichardson, W. E. Pipestone
 Arichardson, W. J. Fairmont
 Arichmond, Chas. D. Jeffers
 Aridgeway, Alex. Belgrade
 Aridgeway, A. M. Annandale
 Ariggs, C. Eugene. St. Paul
 Arlppert, J. A. Proctor
 Arishmiller, J. H. Minneapolis
 Arisser, E. D. Winona
 Aritchie, H. P. St. Paul
 Arizor, B. J. Minneapolis
 Arhines, D. C. Caledonia
 Aron, Carl M. Minneapolis
 Arobbins, C. P. Winona
 Aroberts, L. M. Little Falls
 Aroberts, Thos. S. Minneapolis
 Aroberts, W. D. Minneapolis

Robertson, A. W. Litchfield
 Robertson, J. B. Cottonwood
 Robertson, W. P. Litchfield
 Robilliard, C. M. Faribault
 Robilliard, W. H. Faribault
 Robinson, J. M. Duluth
 Robitshek, E. C. Minneapolis
 Rochford, W. E. Minneapolis
 Rockwell, D. C. Rochester
 Rodda, F. C. Minneapolis
 Rodgers, C. L. Minneapolis
 Rogers, F. D. St. Paul
 Rogers, John T. St. Paul
 Roholt, C. L. Waverly
 Rood, D. C. Hibbing
 Roodman, I. M. Ponsford
 Rose, J. F. Lakefield
 Rosen, S. Minneapolis
 Rosenberry, B. P. Winona
 Rosenow, Edward C. Rochester
 Rosenwald, R. M. Minneapolis
 Ross, J. W. Rochester
 Rosseau, Victor. Maple Lake
 Rothenburg, J. C. Springfield
 Rothrock, J. L. St. Paul
 Rothschild, H. J. St. Paul
 Rowe, O. W. Duluth
 Rowe, W. H. St. James
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ORIGINAL ARTICLES

TRAUMATIC SURGERY AS VIEWED FROM AN INDUSTRIAL STANDPOINT*

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Traumatic surgery, as applied to industry, covers a very broad field. Those of us who labor, whether it be on a farm, in a factory, or in an office, should be classified under the general heading of industry. Industrial surgery has been developed to a marked degree of specialization in recent years, keeping pace with the general industrial development. Working conditions which exposed the vast army of employed to certain hazards have been recognized by the progressive employer, and this has resulted in great constructive safety movements and highly developed medical and surgical organizations becoming a part of the personnel of modern industrialism.

The thoughtful employer is cognizant of the fact that conservation of the human machine is of the greatest importance. The medical profession, to a great extent, never has participated in the general plan of industrial organization. Employers today charge the industrial surgeon with keeping to a minimum the disability hours which, when translated into earning power, cause an immense loss of wages to the bread-winner. Surgical infection in industry produces more loss of man-power than the entire catalogue of so-called industrial diseases. Too often, the industrial surgeon has been considered a necessary evil and consulted only in extreme emergency. Industry now recognizes the great need and benefits, both commercial and humanitarian, of a well organized medical department. The sanitary problems in industry are solved by the application of preventive medicine, and the employer now demands standardized preventive surgery for increased production.

It is a sad commentary upon our profession, however, when we contemplate the great dearth of medical men who have executive ability, broad

vision and fearless mind, so necessary to a grasp of this great problem of industry.

Approximately 52,000 United States participants were killed in the late war. During the same period, 125,000 persons were killed by accidents in the United States. There were two million accidents in which the disability extended over a period of one month or more, with probably ten million of less than one month or of no disability. These statistics are startling, but nevertheless true.

LESSONS DERIVED FROM THE WAR

Some members of the profession maintain that nothing new or constructive was learned from the war; others hold that much was developed that is applicable to civil practice. Opponents of new methods and their practical adoption may well charge themselves, and justly too, with at least partial responsibility for the lives of many who now lie on Flanders field and the western front, as well as for many of the thousands of cripples whose disabilities would have been materially lessened had they received the treatment that modern science affords. The destructive critics and obstructionists who stand in the path of progress will have much to answer for. Frequently the most flagrant offenders are the so-called leaders, who are so self-satisfied that they will not comprehend that which is contrary to or different from their own pet theories or past practices. They have closed minds. As a result of this stubborn and tenacious position, the profession in general is not prone to accept ideas or methods which may be contrary to the teachings as handed down by its leaders. Theories are so deeply imbedded in their souls and minds that they are oblivious to facts and results which should convince even the most hypercritical. As a result of this reluctance of the profession to accept new methods, we fail to utilize many great scientific advances until years after their first discovery. The acceptance of antisepsis, vaccines, anesthesia, germ life, etc., all met with vicious opposition.

So it is with the medical discoveries of the war. Carrel's great contribution on wound treatment was given little consideration or credence when first presented. In the minds of these so-called

*Presented before the Southern Minnesota Medical Association, Mankato, December, 1921.

leaders, it simply could not be true because it had not been done that way before. While the Carrel treatment was being discussed, many unnecessary sacrifices of life were made. The basic principle of general excision of wounds and devitalized tracts could not be generally carried out at the front because of the lack of casualty clearing stations, transportation, etc. The primary mechanical and then chemical sterilization of wounds, followed by secondary closure, was performed in only three hospitals in France, England and Belgium in November, 1916, many months after Carrel's paper was presented before the Academy of Medicine in Paris.

Time will not permit the relating of the train of events from that time until the end of the war, other than to state that the principles suggested were very reluctantly accepted. Carrel and Dakin succeeded in perfecting a technique of making sodium hypochlorite solution of definite strength and with a minimum of caustic (alkaline) action by adding bicarbonate of soda. In this way it differed materially from Javel water, Labaroque's solution, Eusol, etc. The difficulties with Dakin's solution, as made from bleaching lime, with its well known uncertain volatile chlorine content, decidedly prevented its general acceptance. Its transient stability and laborious titration, together with ever-present caustic alkalies, frequently resulted in defeating its well-merited principles.

There has been perfected by a special electro-chemic process a standardized, concentrated solution of sodium hypochlorite which is isotonic in dilution, free from caustic alkalies, having a special alkalinity. This concentrate is stable and uniform. It is remarkably solvent to bacteria and organic débris and leaves the living tissues intact. This concentrate contains sufficient sodium chloride so that by proper dilution an isotonic (1 part concentrate, 9 parts water) hypertonic, or hypotonic solution can be instantly made. Sir Almoult Wright has laid great stress on hypertonic saline solution on account of its increased osmotic action as well as increase in drainage. A Dakin solution made from this concentrate is decidedly less irritating and non-destructive to all metabolism. It is the first solvent antiseptic ever placed before the profession that will destroy all bacteria with which it comes in contact, as well as dissolve organic débris (proteins, albumen, etc.) and at the same time leave the living tissues intact. It literally burns up the bacteria and proteins without any

caustic or destructive action on the living tissues. If intelligently used, it will destroy, by direct contact, bacteria regardless of their location. This is a tremendous step in advance, as heretofore most antiseptics caused more harm than benefit by their coagulation of proteins.

The profession has been extremely backward in accepting this preparation, which has been approved by the Council on Pharmacy and Chemicals of the A. M. A. We have now arrived at the stage where we can say definitely that infection should rarely occur in wounds. I am speaking of wounds of trauma, and not operative wounds. In view of past experience, we cannot expect these statements to be accepted by the profession for many years. The lay public, however, is fast learning of medical progress and the time is near at hand when we are going to be censured for our errors of omission and commission.

THOMAS SPLINTS

The Thomas splint was devised by Hugh Thomas approximately fifty years ago, but the profession would have none of it, so it was not until the late war that its merits were recognized. Every hospital, ambulance, and first aid hospital should be equipped with these splints. At present, they are only occasionally used. The Balkan frame is also most indispensable in the treatment of fractures and traumatisms. They should also be part of the general hospital equipment.

MOBILIZATION OF FRACTURES, DISLOCATIONS, SPRAINS, ETC.

Notwithstanding Champonaire's appeal of 25 years ago in which he clearly pointed out the advantage of early mobilization, the profession never accepted his doctrine. The terrible permanent crippling results of the early part of the war drove us in sheer desperation to other methods. Now, all unite—except those who have had no experience or are lacking in knowledge of the physiology, anatomy and mechanics of the body—in inaugurating at the earliest possible date the mobilization of traumas. Confined rest and immobilization have done more harm than they have ever done good.

EXTENSIVE COMPOUND COMPLICATED FRACTURES

The prevention of infection is extremely difficult in this type of case. We are now able by doing a complete débridement, securing a correction of the deformity and a fixation with plate and screws (the wounds being left wide open), and following with the Carrel method of sterilization, to save

many cases from amputation, conserve function and say definitely that there is practically no danger from infection if the blood supply is sufficient.

At the end of from four to six weeks, plates and screws are removed (as they have served their purpose) and the wound is allowed to close by granulation or secondary suture. We have been told almost universally that this should not and could not be done. The use of steel plates, screws, etc., in the early part of the war was most disastrous, and was practically forbidden in the British army. At that time they had not learned how to either mechanically or chemically sterilize wounds and their casualty clearing stations and transportation facilities were such as to make the practice productive of frightful end results.

In civil practice, one can usually do a débridement within the first few hours, at the same time keeping the patient under observation and treatment. In the extensive comminutions plates are not indicated and are likely to cause annoyance. They are of great value in holding fractures in perfect end-to-end alignment and cause no trouble other than staining of tissues due to oxidation and possible superficial necrosis of the bone.

BONE GRAFTING

In civil and industrial practice, bone grafting is usually indicated when there is a great loss of substance and in certain pseudo-arthritis. Many of these operations are the result of improper correction and alignment, which could be easily obviated if the malpositions were corrected early. When the profession and public realize that much of the so-called setting of fractures by the closed method is quite impossible and that proper early corrective operations offer the best possible end results with good function, then only shall we eliminate much reconstructive and orthopedic surgery which is to a great extent due to confusion of methods and faulty practice. When fractures are anatomically reduced, the indications for bone grafting will be rather rare.

TWO-STAGE OPERATION FOR AMPUTATIONS

Amputations following trauma were frequently followed by profuse infection and sometimes gangrene. It must be remembered that the trauma incident to these extensive injuries frequently devitalize the tissues and that sloughing and infection is most common despite all attempts at asepsis. It has been our practice in cases of shock and hemorrhage (where the shock is not too profound) to

perform a modified guillotine operation, leaving the skin flaps sufficiently long so as to permit of secondary closures without further re-amputations.

The Carrel technique with sodium hypochlorite from .5 to 1 per cent keeps the wound perfectly aseptic and permits of secondary plastic operation, which, in many cases, has conserved knee joints, as well as life.

In a large series of cases during the past six years, we have had but one failure and that was not due to the method. We have materially reduced our mortality, convalescence, etc., as well as preventing many extensive and unnecessary higher amputations. Secondary closure following chemical sterilization of the amputations has been uniformly successful. This procedure has simplified the treatment of extensive crushes, and one can definitely state that infection will not take place if the details of the technique are followed. The attempts to modify and constantly change basic principles is the chief cause of failure and poor results. The failures are due to personal lack of understanding and not to the method.

SKIN GRAFTING

Previous to the chemical sterilization of wounds, approximately 50 per cent of our skin grafts were failures. This was due to our grafting on granulating tissue which appeared clean to the naked eye, but on culture or smear proved to be infected. During the past five years, we have followed this technique with the result that in approximately 1,500 grafts, 98 per cent have been successful.

Granulating wounds are chemically sterilized (an average of one bacterium to four fields); the area is then well covered with grafts (Tiersch or Wolf) and protected with a basket-weave dressing, using small strips one-eighth to one-fourth inch wide of perforated Cello-silk, which is transparent, covering this with a loose pad of gauze into which Carrel tubes properly perforated are incorporated.

The wound is injected every two hours with 1-200 sodium hypochlorite. Dressings are changed every four days; the same technique (with dressing as first applied) is continued until healing is complete, which usually occurs in ten days; all dressings can then be discarded or just dry dressings used.

Failures in skin grafting are due almost entirely to the attempt to graft on infected granulations and the failure to keep the wound aseptic, or relatively so, following operation. The end results of

this operation are in direct ratio to the thoroughness with which the details of technique are carried out.

PARAFFIN TREATMENT OF BURNS

The paraffin-wax, or so-called Ambrine, treatment of burns was also severely criticized by our pseudo-scientists. It did not agree with their theories. Its great advantages over all others should make it the standard treatment of burns. During the past five years, we have treated over 25,000 burns with this method and have discarded all others because of its great superiority.

COMPENSATION RESULTS

The Compensation Board of New York stated several years ago that one-third of all wounds were infected. This was undoubtedly due to delay in receiving immediate treatment and improper surgical treatment. The New Jersey Compensation Commission reports that 33 per cent of the cases applying for compensation must be referred back to the surgeon for reconstruction.

In a recent article, a noted surgeon reported four excellent results in fractured femurs (children under twelve) in a series of sixty-seven cases. In a survey of 3,000 cases of fracture of the femur (since the war) only 90 of this series had 10 per cent or less of disability. Are these end results something of which we can justly boast? I think not.

Sir Arbuthnot Lane has made the statement that no one who had ever received a fracture of the femur treated by unoperative methods ever returned to active duty on the London police force. How many thousands are permanently crippled as a result of faulty treatment of fractures it is impossible to state. It is certain that if proper methods were employed, much disability could be prevented. Those who persistently oppose the operative method in the correction of vicious fractures have nothing better to offer, and their poor results with the operative method can only be due to the time-consuming, mutilating, unskilled technician and in no way due to the screws and plates, which, if correctly used, caused little or no trouble.

Sterilized steel screws and plates do not carry infection, but the careless and incompetent surgeon does. There is no more occasion for infection in the operative treatment of fractures than in the ordinary hernia or simple appendix. Where the

teaching of Lane is carried out in detail, infection rarely occurs.

Let us cease this useless and almost endless discussion and accept certain demonstrated facts that have been proven meritorious and in advance of obsolete and medieval practices.

We are, to a certain extent, responsible for the growth of bone-setters, osteopathy, chiropractics, sciences, etc., because of our many poor and unsatisfactory results. We stubbornly refuse to accept the value of mechano-electro-hydro-therapy. There is no question but that this field has been sadly neglected. Few hospitals and fewer doctors pay any attention to these methods of therapy. There are other methods of treatment beside the scalpel and polypharmacy.

Some years ago, the writer standardized the methods and practices (the standards being elastic) of the surgeons of the Carnegie Steel Company, with the result that infection of wounds was reduced from 50 per cent to one in 700 (in a series of 77,000 cases).

At present, chaos exists throughout the profession as to the best methods of wound treatment and operation in various types of trauma. Reference to the voluminous literature causes only mental confusion and the investigator is left with conflicting opinions on almost every subject. Some attempt should be made to clarify this situation which would serve as a guide to those seeking the truth and which is based upon scientific facts and accepted practice rather than the theory or opinion of someone with limited experience, but long on theory.

We have advanced so far in surgery the past 25 years that much we do should be relatively standard and further experimentation is useless and provocative of much harm. The author clearly saw the necessity of adopting certain standards at the beginning of the war. Little support was given this plea. The failure to inaugurate a definite policy caused endless confusion and chaos, and, as a result, we did not give the wounded, generally, all the advantages of scientific advances. Let us profit from our mistakes of the war and put into civil practice the best approved methods and discard that which is obsolete and unscientific. The public very often is just a step in advance of us and it behooves us of the profession to keep pace with modern progress.

DISCUSSION ON THE PAPER OF DR. WILLIAM O'NEILL
SHERMAN

DR. CHARLES H. MAYO, Rochester: It is very interesting to hear a man with such an enormous experience in surgery as the essayist has had, tell us about his work. I do not believe that we have yet completed our work concerning antiseptic details. It will change, and Dr. Sherman expects it will change some day.

David Harem tells us about the dog that had fleas which kept him irritated. We as a profession are constantly kept irritated by the dissenter. It is the dissenters who make trouble before they develop some better method, and the essayist is right in saying that some of the best men in this country wrote articles on and made discussions against the Carrel-Dakin treatment. I want to acknowledge the debt of gratitude we owe to the surgeons, Dr. Sherman among them, for what they did in regard to developing this method of treatment.

DR. M. S. HENDERSON, Rochester: We are fortunate in having had Dr. Sherman come from Pittsburgh to tell us of his interesting experiences. He has the opportunity of observing a tremendous number of industrial accidents. We of the Middle West have not that opportunity.

I shall touch on some things that particularly interested me in listening to this paper. The Carrel-Dakin treatment is undoubtedly the biggest advance we have had in many years. As perfect as it may seem to be, I believe we will strike something better in the future. One thing that is often overlooked in the Carrel-Dakin treatment is that it must be preceded by excellent surgical procedure. Dead tissues must be removed; the wound or wounds should be thoroughly cleaned and an antiseptic introduced which is nearly ideal.

Dr. Sherman mentioned a patient operated on by Meyerding in our clinic. We have had quite a number like that with excellent results, so that we have been encouraged in the continuation of the method.

I was particularly interested in what Dr. Sherman had to say about metal plates. There has been a great deal of criticism of the use of the metal plate, because in recent years the bone graft has come into prominence. Bone grafting is the proper procedure for ununited and delayed fractures, but is hardly proper for recent fractures.

There is a controversy about the open and closed methods of treating fractures. The closed method always will be the method most commonly employed, but the open method has its very definite place. In the Mayo Clinic, I think we are operating on more recent fractures than ever before and I know that our results are better. A perfect anatomic result means a perfect functional result. We do not operate on all, but we do operate on a good many and do not hesitate to use the metal plate, if deemed necessary for fixation. I agree with Dr. Sherman that infection should not follow the use of metal plates if careful technic is used, but I know that infection is more likely to occur from using metal plates than from using absorbable material such as beef bone. I have seen infection develop two or three years after the use of the metal plate; therefore, the infection must be by the blood stream in the late cases.

Infection is a subject that interests us in all kinds of surgery, and during the last year we reviewed all bone

graft operations performed in the clinic, and found that cases of infection were rather higher than we had thought. In old ununited fractures, the infections amount to about 10 per cent, which is too high. This group of cases, however, in which much handling of the tissues during operation and trauma incidental to the dissection of the large amount of fibrous tissue are unavoidable, is difficult to treat.

In a simple fracture, the use of a metal plate should not cause infection, but it has been our custom to remove the metal plate as soon as it has served its purpose and the fracture has united.

DR. KARL CONNELL, Omaha, Nebraska: Dr. Mayo has touched on the sweeping affirmatives of the essayist of the evening. Permit me to inject my personal feelings before opening the discussion. * * * *

Regarding the plating treatment of recent open fractures, my own early twelve years of experience at Roosevelt Hospital, New York, with an average of only 900 fractures a year, in no way compared with the experience of the essayist of this evening. My experience has been with a number of young boys in surgery who have not had the advantages of being able to dictate. Over these occasional fractures at the Roosevelt Hospital we boys fought back and forth, yet the result was that out of each hundred fractures we could find only two or three cases in which we thought it would be advantageous to plate. Of course, many operative expedients had to be employed, such as the ice-tong suspension, Stineman pin traction, etc., and occasionally when muscle was interposed the end result would demand open intervention and plating. I have, therefore, no right to detract from the usefulness of the bone plate, yet I regard the sweeping use or advocacy of the plate as courting disaster, and more certainly so in the compound fracture. Certainly not in New York nor in my present location in Omaha, have I seen results to warrant the promiscuous plating of fractures. To the contrary the result has been shocking in the hands of the average surgeon, and Dr. Sherman must take these things into consideration, that neither New York nor the middle west enjoys the rarefied atmosphere of the Alleghenies nor his own surgical skill in handling these cases.

With regard to Ambrine in the treatment of burns, Dr. Sherman asks, "Why this cry about Ambrine?" I answer because it is called Ambrine, and was introduced as a mysterious all-potent healing agent by the press of this country early in the last decade. Had it been called plastic wax—had it been stated that it adhered to crusts—had it been stated that it allowed a free drainage of the wound laterally—had it been stated that it was a better protection for burns than vaseline, that would have been within its rights.

Ambrine has achieved great good in calling attention to the fact that complete protection as with Nature's scab, and daily painless non-traumatising removal of that scab is a remarkable surgical treatment for burns. But that Ambrine has any advantages over any similar preparation of paraffin, rosin and beeswax, I personally have not been able to observe. A suggestion that may be of advantage: I have found that the burns heal more rapidly if, on dressing the wound each day, a mild antiseptic spray is used. I formerly employed 1 per cent protargol but in recent years

have employed dichloramin .25 per cent in chlorocosan sprayed on the wound before painting on the liquefied wax and reinforcing with cellulose.

With regard to methods of skin graft, Dr. Sherman has ably impressed the most vital point, i. e., that the grafted surface must be surgically clean. I learned this under the late Doctor Chas. McBurney, who achieved in his time well nigh perfect takes by careful preliminary cleansing of the surface and then by gauze wiping to prepare a fresh, clean surface, duplicating what the modern war surgery accomplished by débridement, i. e., dry primary union. We can, therefore, sterilize the wound for skin graft mechanically as well as by the Dakin-Carrell method employed by Dr. Sherman. A combination of the two might prove of advantage.

I express my high appreciation of the forceful manner and personal conviction with which the essayist presents his points.

THE CAUSES OF FAILURE OF OPERATIONS FOR CHRONIC APPENDICITIS*

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The removal of the appendix because of a diagnosis of chronic appendicitis is one of the most frequent procedures in general surgery. Because it can be easily and safely removed, it would seem that the operation should be followed by a cure in practically all cases; but the investigations of surgeons who have carefully followed up their cases show that the results can hardly be considered to be as satisfactory as it would seem they should be.

In 1916 Connell reported that among 212 patients operated on by him during the preceding seven years, there were 48 who failed to get relief of symptoms. He used the term "pseudo appendicitis" in connection with these failures, and especially warned against advising operation for chronic appendicitis in patients who had chronic constipation, enteroptosis, and neurasthenia. Last year Gibson reported the result of his investigation of 555 cases which had been operated on during the preceding six and a half years. He received 426 replies to his letters of inquiry. He divides the results into excellent, satisfactory, and unsatisfactory, and finds that 102 cases should be reported as unsatisfactory.

I have had "follow-up" letters sent to the patients operated on in the surgical service of the University Hospital during the years 1918 and 1919, in whom

the diagnosis was chronic appendicitis. Patients who had other recognized pathological abdominal or pelvic conditions were not included in this list.

The total number of cases was 121, and from these patients we received 94 replies. I have divided these replies under the headings, cured, improved and unimproved, and find that 66 have been cured, 20 are to be classed as improved, and 8 as unimproved. Among the improved we include those who report themselves better, but still having constipation, or vague pains at times, or other indefinite symptoms. There were no deaths in this series and no complication more serious than a stitch abscess, except in one patient who developed a post-operative pneumonia which ran a short and mild course. There were 55 males and 39 females in this number, which is as it should be, since it has long been recognized that appendicitis is more common in the male. Among the cured, 42 were males and 24 females; among the improved, 9 were males and 11 females; and among the unimproved, were 4 males and 4 females; showing that the prognosis as to cure has been much better in the male patients.

We have always regarded the history of a former acute attack as an important diagnostic point in chronic appendicitis, and we find that in our 94 cases there were 68 who gave a history of acute attacks at some previous time, and 26 who did not give such a history. Among the cured cases, 52 gave a history of an acute attack while 13 did not; among the improved cases, 11 had had acute attacks and 9 had not; and among the failures, 4 admitted acute attacks and 4 did not. We learn from this that the prognosis as to cure is much better when there is the history of former acute attack.

In the operation reports, it is found that the appendix is described as definitely pathological in 39 cases, and as doubtful or showing no pathological change in 5 cases; and of these 5 cases, 1 is listed in the improved column and 4 in the unimproved. This shows that 19 out of 20 improved cases and 4 out of 8 of our unimproved cases showed pathological changes in the appendix, and still were not cured by the operation.

In all patients who come to us complaining of chronic appendicitis and where the history and findings are not completely typical, the diagnosis is practically made by exclusion, plus the direct evidence of a diseased appendix. A patient without a history of an acute attack is regarded as atypical, and operation is not advised unless the symptoms

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are very definite and characteristic. If the patient complains of gastric symptoms, while we realize that hyperacidity, pylorospasm and epigastric tenderness may be caused by chronic appendicitis, we do not admit it as the cause in any individual case until gastric analysis and x -ray series have been negative; and even then we make an exploratory rather than the muscle-splitting incision. It is now generally recognized that chronic appendicitis bears an important etiological relation to gastric ulcer and cholecystitis and we find them frequently co-existent. By observing these precautions many gastric and duodenal ulcers and cases of cholecystitis have been found in patients with chronic appendicitis (these cases are not included in this series), and if the appendix only had been removed they would have been found added to the number of failures.

In like manner, if there is anything in the character, location, or reference of the pain which suggests the kidney or ureter as a possible explanation of the condition, we are not satisfied that a negative urinalysis excludes the kidney or ureter, but refer the patient for x -ray examination, cystoscopic examination, and pyelography if the urologist thinks it indicated. We realize that in chronic appendicitis there may be found slight increase in the number of leucocytes in the urine, but we believe that their presence puts the burden of proof on the appendix, and on the other hand it is well known that pathology in the kidney or ureter may produce symptoms, while examination of the urine shows it to be normal. By referring such patients to the urologist, even in the presence of normal urine, we have been led to refuse operation for chronic appendicitis in several cases, where if the appendix has been removed we would have had to add to the number of our failures.

In dealing with pronounced neurotics it is often difficult to come to a definite conclusion as to diagnosis. It is perfectly true that a neurotic patient may have chronic appendicitis, but on the other hand such a patient, by complaining of vague pains, perhaps especially located in the right lower quadrant accompanied by an indefinite tenderness may easily lead one to make a diagnosis of chronic appendicitis when it is not present; and again, the removal of a chronically diseased appendix in a patient who is decidedly neurotic is very likely to disappoint in the amount of improvement which follows, and may fail to give any relief whatever. Operations for psychic effect have long since proven

their worthlessness. Patients with mucous colitis, even if they have pronounced tenderness in the region of McBurney's point, will generally fail to be benefited by an appendectomy; and this also applies to patients with marked visceroptosis.

In the cases reported as improved, it is difficult as a rule to explain why recovery has not been complete. Constipation is complained of by many of these patients, and it is possible that in some of them it was the cause of the appendicitis, and that the removal of the appendix has naturally failed to relieve it. In others it is possible that, being somewhat neurotic, they are bothered by the scar enough to complain of pain. In others there are undoubtedly accompanying minor conditions such as moderate enteroptosis, pelvic displacements, etc., which still cause some discomfort; and in some cases adhesions may be the explanation for incomplete relief. Gibson has noted a very marked improvement in his results recently, and is impressed by the fact that this improvement has occurred since iodine was discontinued in the preparation of the patient. He now uses 5 per cent picric acid in 95 per cent alcohol, and believes that although its antiseptic action is as strong as tincture of iodine and its penetrating power as great, it is less irritating to skin and peritoneum, and that peritoneal adhesions are not nearly so likely to occur following its use as a skin antiseptic. The report of such a reliable observer should carry considerable weight, and we have recently begun the use of picric acid in the preparation of the abdomen for laparatomies.

After a careful study of the hospital records of the 8 failures, we have concluded that 3 patients had gastric ulcer at the time of the appendectomy, and that this accounts for the failure in these three cases. They were males with gastric symptoms and findings on gastric analysis or x -ray examination which pointed to ulcer. Exploratory incisions were made in these cases, and ulcers could not be demonstrated at the time of operation. Following our rule, which is not to make a gastro-enterostomy unless distinct evidence of pathology is found in stomach or duodenum, we only removed the appendices in these cases, one of them being distinctly pathological, and the other two doubtful. The persistence of the symptoms has convinced us that the ulcers are still making trouble. We are still of the opinion that the proper treatment in these cases, where the ulcer is probably present but cannot be demonstrated, is to remove the appendix and advise

medical treatment of the ulcer, hoping that the removal of a diseased appendix, which may have caused the ulcer, will aid in obtaining a medical cure. We do not think that a gastro-enterostomy should be lightly undertaken in the absence of evident pathology, because in such cases it is likely to do more harm than good. In one male patient with gastric symptoms but negative x-ray and gastric analysis findings, an exploratory operation failed to show any pathology in gall-bladder, stomach or duodenum, but did show a very evident chronic appendicitis for which the appendix was removed. The patient reports that he is still having the same symptoms. We feel that he may have a gastric ulcer, or a strawberry gall-bladder which was not recognized at the time of operation.

One patient was a hysterical girl, whose badly diseased appendix was removed without benefit to her. The explanation of failure in her case is the hysteria.

One female patient had a pronounced viscerop-tosis and the only pathology found in the appendix was a kink at its middle. The appendix was removed, but no improvement resulted, nor was it to be expected.

In one female patient with atypical history, in whom a diseased appendix was removed through a muscle-splitting incision, no improvement followed, and we are at a loss to explain the failure unless it be that additional pathology was present in the abdomen and was not discovered because a muscle-splitting instead of an exploratory incision was used.

In another female patient, where a diseased appendix was removed through an exploratory incision, we are not able to account for the improvement being so slight as to cause her to be listed among the failures.

After a careful study of this series of cases, we must admit that the results of operation for chronic appendicitis in our hands are not satisfactory and that there is considerable room for improvement. In attempting to secure better results we believe that the following points are of great importance:

1. These patients should have more careful examination and often more prolonged observation, especially if the condition is not in every way typical.

2. No patient should be regarded as having typical chronic appendicitis unless a history of a former characteristic acute attack is obtainable.

3. Extra care and consideration should be used

before advising operation in neurotics, especially those with colitis or viscerop-tosis.

4. More exploratory incisions should be used in preference to the muscle-splitting incision, and always in atypical cases; and the exploration should not end with the discovery and removal of a diseased appendix.

5. Believing that a considerable amount of trouble complained of after operation may be due to adhesions, we regard the suggestion of Gibson as valuable, and will try out picric acid instead of iodine in the preparation of the site of operation.

DISCUSSION

DR. ARTHUR C. STRACHAUER, Minneapolis: It is a great satisfaction to have heard Dr. Rowan's sane and important presentation of this subject. In the University Clinic in Minneapolis we have practically discontinued the employment of the diagnosis of chronic appendicitis as a single entity. Likewise, we have discontinued the employment of the muscle-splitting McBurney incision, using it only in the cases of children and young adults in the early stages of an attack of acute appendicitis, or at an "interval operation" following a definite history of acute attacks. Much confusion exists regarding the pathology and nomenclature of the various forms of appendicitis. The cases in which we get a history of previous and repeated attacks we prefer to call cases of recurring appendicitis. Even though the muscle-splitting incision of McBurney is satisfactory for the removal of a definitely diseased appendix, the incision is inadequate in that it does not permit a general examination of the abdominal contents. The frequency with which co-existing diseases obtain in the gall-bladder, stomach and duodenum, makes removal of an appendix through a McBurney opening an incomplete procedure. The patient can be cured only by the performance of complete surgery. Some of the patients who have had unsatisfactory results following appendectomy have been patients in whom cholecystitis or cholelithiasis, ulcer of the stomach or duodenum, have been overlooked. I have opened the abdomen and found a grossly diseased appendix with coexisting ulcer of the stomach, ulcer of the duodenum, and a diseased gall-bladder containing stones. Surely the performance of an appendectomy here could hardly be expected to cure the patient.

Appendicitis must be looked upon as the result of a hematogenous infection which frequently involves the gall-bladder, pancreas and kidney, causing ulcer of the stomach and duodenum. Most of these infections clear up, or any one, two or three of the lesions may remain permanently. This conception explains the complicated pathological findings present on opening of the abdomen. The clearing up of all primary and secondary foci of infection is, of course, essential to success.

Surely, the day for treatment of constipation, mucous colitis and Glenard's disease by the performance of appendectomy has passed, and it is hardly worthy of discussion; we do not expect results from surgery directed to that type of disorder.

In addition to the unsatisfactory results following appen-

dectomy due to the development of postoperative adhesions, resulting from the trauma to the peritoneum or the irritation from the tincture of iodine, I believe that the routine covering over of the inverted stump by the meso-appendix is one of the common causes of dissatisfaction. I am sure that many of us know of cases in which so-called chronic appendices were removed and the patients not only not cured but left in a worse condition, having more pain and either increase in ileocecal stasis or the development of such stasis which did not formerly exist. The routine fastening of the meso-appendix over the region of the stump of the appendix in some cases exaggerates an already existing Lane's kink or causes an artificial one. Upon careful examination of the terminal ileum it will be found, in a considerable number of cases, that there is a strip of tissue containing fat running down from the last inch or inch and a half of the ileum and attaching itself to the meso-appendix. Sewing the meso-appendix over the stump of the appendix, in such cases, causes the kink of the ileum. The meso-appendix should be sewed or tied over the stump of the appendix only in those cases in which it will not cause this kink.

The matter of the irritation from tincture of iodine causing adhesions, referred to by Dr. Rowan, is an important consideration, not only in the performance of appendectomy but in every laparotomy. While we routinely employ the iodine preparation of the abdomen, by careful attention to the walling off of the wound with towels held by clamps and in addition the placing of moist compresses over the wound margins, the iodine can be completely excluded.

Dr. Rowan has given us a valuable message. There is no question that too many appendices have been removed in the past, and that much pathology has been overlooked by the removal of the appendix through a small incision.

DR. M. H. CREMER, Red Wing: When I first read the title of Dr. Rowan's paper I concluded that it was a very appropriate subject to bring to the attention of both the medical and surgical professions. Then, after receiving a copy of the thesis on the subject by the essayist, I could not help but recall the numerous instances in my own experience, especially in the earlier days, when surgical differential diagnosis was not so readily made. And up to this time, with all the appendix experience that the profession has enjoyed, we still make errors.

Sometimes the symptoms are so varied, so perplexing, and so misleading that they offer us a ready explanation of the failures of operation. Just a few weeks ago I operated on a gentleman past fifty who gave a history of recurrent colic extending over a period of two years, acute appendicitis three years previous. Stomach analysis was negative. An exploratory incision disclosed nothing except three small concretions in the tip of the appendix and some kinking. He left the hospital in ten days. On his way home he suffered an attack of exactly the same kind of colic as before and was brought to my office. The incident occurring as it did would have made me think of gall-stones, had I not previously investigated.

In all cases, with the exception of acute appendicitis, I think we should adopt the incision whereby we can investigate the interior.

I want to call attention to another matter of interest—

Lane's kink. This frequently gives rise to abdominal disturbance. While this abnormal condition is ignored by some, it can, to my mind, produce symptoms. The ileum is not only drawn down and angled, but it is rotated upon itself, so to speak, which naturally must disturb the normal peristaltic wave, possibly producing a reversed fecal current. I always release a kink, and by so doing have often effected relief of symptoms in cases where a previous appendectomy had been done.

I think that in all cases of appendiceal irritation there is a marked resistance or rigidity over the right rectus border, and unless I get a history of repeated attacks without this resistance in the abdominal wall, I defer operation or rather advise against it. We must largely rely on the history as the patient gives it, not as it is suggested to him, because a neurotic accepts suggestions which may lead to a false interpretation of the actual symptoms present. Many times postoperative symptoms are neurological. The pain may be due to imperfect bowel movement, or the traumatization of the ilio-inguinal or some of its small branches or adhesions. These can be largely avoided by keeping the fingers and retractors out of the belly. Personally, I never use instrument retraction in abdominal operations and avoid as much as possible contact with the parietal peritoneum.

DR. CHARLES H. MAYO, Rochester: This paper reminds me of a similar one written by Dr. Cabot years ago in which he reported his investigations of patients operated on in two of the larger hospitals of Boston, showing that one patient out of six failed to be relieved of the symptoms he complained of.

The old McBurney incision has been very properly brought before us. The McBurney operation is a good operation for children, but not a good one for adults, because although there is appendicitis, there is no reason why the appendix, which is so commonly a focus of infection, should not play an important part in the development of pathologic conditions in the upper abdomen, such as gall-bladder disease or ulcer; consequently we should explore the upper abdomen in the adult except in acute conditions, where one may not care to do any exploration.

The subject has been very thoroughly covered, and I think it is good for us from time to time to have such discussion.

DR. ARCHIBALD MACLAREN, St. Paul: I feel that Dr. Mayo struck the keynote when he said that he was always afraid of those patients on whom he operated for chronic appendicitis. Personally, I have made so many mistakes and have gotten so many of these letters, that I know there is no imagination about it. An appendix that really needs attention had better be removed through a right rectus incision. A cross muscle incision has caused death in some of my own acute cases. That is one place where the cross muscle incision should never be used—the acute case. I remember one of these cases so well in a girl who got sloughing of the abdominal wall apparently following a tearing of the fascial planes, and she died as the result of a superficial infection, the peritoneal infection, as was shown at post-mortem, having subsided.

DR. A. E. SOHMER, Mankato: These cases are usually instances of mistaken diagnoses, and I want to report a case

that occurred in a railroad man. After an accident it was thought he had appendicitis due to the injury, so-called traumatic appendicitis, because he had previously pain in the right inguinal region. His appendix was removed; he continued to have pain; post-operative adhesions were removed and he continued to have pain. In analyzing the case, it was found that the pain followed the course of the ilio-inguinal nerve. X-ray showed a spondylitis on the right side causing pressure on the nerves. There is an instance where the case simulated chronic appendicitis. He could not have been cured by removing the appendix because the wrong end of the nerve was attacked.

DR. S. MARX WHITE, Minneapolis: I wish to call the attention of the Program Committee to an omission when discussing failures in the operative treatment of chronic appendicitis in leaving the internist out. The internist is a considerable factor, and I should like to call attention to one or two matters in this connection.

The surgeon has already indicated his interest so far as the problem of diagnosis is concerned, and I do not propose to touch on that at all; yet there are a good many of these cases in which the diagnosis cannot rest solely on the results of immediate operation. Some of the cases of so-called chronic recurring appendicitis or chronic appendicitis after an acute attack can be decidedly benefited by proper dietetic and hygienic management, and in discussing this I want to say that after the removal of the appendix, may not the appendix condition be combined with some other general conditions, such as spastic constipation or the atonic type of constipation which can be recognized and by proper, prolonged and intelligent dietetic management combined with hygienic management improve the muscle tone, and may not this be a considerable factor in the surgical treatment of chronic recurrent appendicitis?

DR. C. J. ROWAN, Iowa City, Iowa: I think probably there is good reason for using the term recurrent appendicitis rather than chronic appendicitis; nevertheless, I do try to differentiate between the two conditions. The surgical pathologist absolutely refuses to return a pathological diagnosis of chronic appendicitis, and he calls them healed appendices. In describing a section he will speak of a pronounced lymphocytic infiltration and of white lines along the lymph channels. It seems to me this is an indication that the condition has not healed—that there is still some inflammatory reaction present. I did not take time to differentiate between a chronic and recurrent appendicitis, in that I believe the term recurrent appendicitis may be applied to those cases that have had more than one acute attack of the disease with complete absence of symptoms in the interval. The term chronic appendicitis should be used in the patient who gives a history of an acute appendicitis at one time, but who has a continuous symptomatology. If chronic appendicitis does not exist as a distinct clinical entity, that probably has a great deal to do with the difficulties in the diagnosis and with the mistakes in diagnosis.

In regard to Dr. White's discussion, I feel that medical treatment after the operation may lessen the number of improved cases, but I do not think it will have much to do with the number of failures because failures mean mistakes in diagnosis.

PRIMARY CARCINOMA OF THE LUNG*

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Though primary carcinoma of the lung is rather an unusual disease, we feel that it is more common than was formerly supposed. In 46,169 autopsy reports collected from various European cities, 105 cases of primary carcinoma of the lung were found, or one in every five hundred sections. Perritz reports seventeen out of 21,134 autopsies; Seydel of Munich, 181 cases out of 10,829; Passler, 16 in 9,246; in Lenhartz' 2,956 autopsies, 12 cases were found in two years; in St. George's Hospital, there were no cases of primary carcinoma of the lung discovered. Ewing states that this disease occurs in one per cent of all carcinoma; Kaufmann that it occurs in 1.83 per cent. In 2,393 general admissions to the University Hospital in Minneapolis in seventeen months, there were 82 cases of carcinoma. Four of these on the medical service were diagnosed as primary carcinoma of the lung, and were later confirmed by autopsy.

The first description of this disease was made from autopsy by Boyle in 1810. The next case of any importance was reported by Stokes in 1837. Since then over 500 cases have appeared in the literature. The reports of Lenhartz, Passler, Perritz, Seydel, Wolf, Kuttner, Rolleston, Adler, Kauffman, Ewing, Bryan and Carmen have brought the subject down to the present time.

Statistics show that primary carcinoma of the lung affects males more frequently than females; and that it occurs more often between the ages of fifty and seventy. A few cases, however, below fifty have been reported. Eberman records one in a child nine years old, and Adlhowies one in a child five and a half years old. In our cases, three out of the four were males, and the ages were respectively: 58, 48, 49, 40, making an average age of 48 plus.

Before a study of the reports of the Cobalt miners at Schneeberg and of the workers in the granite quarries of Vermont, it was thought that occupation bore some relation to the prevalence of the disease; but the investigation proved that this disease was found no more frequently in these occupations and

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districts than in any other. Landis, on looking into the dust occupational diseases in this country, found no relationship between them and carcinoma of the lung.

The relations of tuberculosis to carcinoma as a causative agent is questionable. Shaw accepts only eight of Wolf's thirteen cases of tuberculosis occurring in thirty-one cases of primary carcinoma of the lung. Fowler in thirty cases found but two with tuberculosis. Some think trauma to be a factor in the production of carcinoma, but the literature does not support this idea. It may, however, follow primary sclerotic lesions.

From the pathological standpoint, three types of carcinoma of the lung should be considered, depending upon histogenesis: (1) that rising from the bronchial epithelium; (2) from the bronchial mucous glands, and (3) from the alveolar epithelium. All of our cases arose from the bronchial epithelium, or from type one. In this type, the mass, small in the early stages, extends first along the lymphatics or blood vessels of the mucosa, then through the lymphatics into neighboring bronchial and mediastinal glands from which wide-spread metastasis may extend into the liver, lungs, pleura, kidneys, spleen, brain, eye, thyroid, diaphragm, skin, pancreas, gall bladder, spinal cord, bladder and finger tips. It is rare for type one to produce large masses in the lung, though obstruction of the bronchus may occur, producing either bronchiectasis or atelectasis. The right lung, according to statistics, is involved in 54 per cent of the cases, and the left is 35 per cent, 10 per cent being bilateral. In our cases the right lung was affected in three cases.

Primary carcinoma of the lung may appear as: (1) a chronic pulmonary inflammatory disease; (2) a localized tumor; (3) a chronic pleurisy with effusion.

The onset is usually gradual. The patient complains of a constant pain, located deep in the chest. It does not radiate early, and it is uninfluenced by anything that the patient may do. In one of our cases, however, the patient thought that he obtained slight relief when he tied a cloth about his chest in a certain way. But strapping his chest with adhesive plaster, and applying heat gave no relief. The pain probably is not sharp or severe until the pleura is involved; then the pain may be severe, and may radiate around the chest wall or into the abdomen. It is not relieved by a pleural

effusion. The pain was present early in all of our cases, and its presence was of the greatest diagnostic aid. In secondary carcinoma of the lung, the pain is not an early or an important complaint.

Another symptom is cough, which may appear at any time of the disease, either constant or paroxysmal, mild or severe. In Case 3 of our series the cough was distressing; in the other three patients it was present, but it was neither constant nor distressing. In Case 3, following the cough, the patient brought up quantities of bloody tenacious mucus which had a foul odor. For a time there was a great deal of pus in the sputum due to rupture of an abscess about the tumor mass. Either an abscess, bronchiectasis, or gangrene may account for a large amount of foul sputum. In Case 1, the sputum corresponded to the currant jelly type, and in the other two, the sputum was streaked with blood. There were no tumors or fatty degenerated cells. Hemoptysis was present in all of them as an early and constant symptom. It is reported to be present in 72 per cent of cases. It rarely occurs in a large amount or proves fatal. Only two cases are reported in which death followed a severe hemorrhage.

In our series, when the patients exerted themselves, dyspnea was present and progressive from the beginning, and before any complications appeared. This symptom is usually much greater when the tumor mass in the lung is large and grows rapidly, or where there is fluid in the pleural cavity, or pressure on the trachea. The pleural cavity on the side of the disease was obliterated in two of our cases. In two cases there was effusion. When fluid is present, important diagnostic aids may be obtained by pleural taps showing blood-stained fluids which may contain tumor cells, and may have a low specific gravity. It is reported in half of the cases of primary carcinoma that the pleural cavity is obliterated by growth. Carmen states that in 60 per cent of the cases at the Mayo Clinic, dyspnea from metastatic growths was not proportionate to the amount of "existing pathology." Most writers feel that dyspnea is not a prominent symptom of metastatic carcinoma of the lung.

An average loss of thirty pounds in weight, progressive weakness and cachecia occurred in our series. Fever of 102.5 degrees was reached in Case 3, due to an abscess accompanying the disease. It was present as a terminal finding in the other three cases. We do not consider fever to be

a symptom of carcinoma of the lung except as an evidence of complication. However, it usually occurs in about a third of the cases.

Symptoms due to pressure are usually later phenomena. Dysphagia caused by direct pressure on the esophagus, dyspnea from trachial pressure, and hoarseness due to pressure on the recurrent laryngeal nerve were found in two of our series. Distended veins of the chest wall were noted in the four cases at some time during the course of the disease, usually as a later symptom. Cyanosis, edema of the face, neck, and arms, due to pressure on the intra-thoracic vessels, occurred in one case. No patient in our group showed pressure on the brachial plexus.

Tissue was removed for microscopic study in Cases 3 and 4. In Case 3 an axillary gland was shown to be inflammatory tissue. In Case 4, inflammatory tissue was removed through an incision between the ribs from what was thought to be a pleural space. Later a mass appeared externally over the lower sternum, which proved to be carcinomatous tissue. External glands are rarely involved until late in the disease, so that microscopic study, while diagnostic when it is possible to procure tissue, rarely gives much aid. The early blood picture, however, is of value. There is a typical secondary anemia with marked variations in the nuclei of the polymorphonuclearneutrophils, showing many atypical forms with small lobes and small buds and horseshoe shaped nuclei with small buds projecting from them. There is marked segmentation of the nuclei in some cells. The above findings were noted in Cases 3 and 4.

The x-ray, in our experience, has not been of material aid in the diagnosis of primary carcinoma of the lungs. There is no characteristic appearance as seen on the x-ray plate. The most frequent finding is a gross peribronchial thickening with nodulations seen usually in the lower or middle lobes. If seen early the condition is most likely to be interpreted as an unresolved pneumonia, bronchiectases or chronic pulmonary abscess. Later plates, however, showing the rapid extension of the mass, with or without involvement of the pleura, will either give the diagnosis or confirm the previous clinical diagnosis of carcinoma. The greatest aid which the x-ray can give is in ruling against metastatic tumor or tuberculosis. Both conditions are easily differentiated by x-ray from primary carcinoma, except where the pleura is involved.

Though a bronchoscopic examination was not made in any of our cases, we believe that it has a very valuable place in the early diagnosis. By this examination, a growth may be discovered. Yaukauer reports malignant growths as an accidental finding in 12 per cent of his cases.

Metastases have occurred in most of the cases reported, usually in the bronchial and mediastinal lymph glands. This fact accentuates the necessity of a very early diagnosis. In 33 of Adler's 374 cases, no metastases were present. Metastases occurred in all of our cases.

It is stated that individuals with a primary carcinoma of the lung live from three to twenty-seven months from the date of the first symptom. Our cases lived twelve, eight, nine, and eight months respectively, an average of nine plus months. Few cases are reported as cured. Death is usually due to: (1) rupture of the vessels; (2) thrombosis; (3) pulmonary edema; (4) asphyxia; and (5) cachexia.

A very early examination outside of a possible bronchoscopic investigation is negative. Later, with a lung infiltration, there are the usual findings for such a condition. In cases where extension occurs along the bronchial wall, and produces bronchiectases, the usual findings for the bronchiectatic condition will be found. It is this condition which makes necessary careful and frequent observations with laboratory and x-ray studies before a correct diagnosis can be made.

Where metastases occur in the pleura there is a marked retraction and fixation of the chest wall, a lagging of the side on inspiration, weak fremitus and breath sounds, and usually no râles. The various pressure phenomena and a trachial tug may be observed. The presence of the latter in Case 3 of our series simulated an aneurism. The heart may be displaced.

Our greatest difficulty came in differentiating carcinoma from tuberculosis, especially when the process extended to the pleura. This difficulty was also experienced in the chest department of Jefferson Hospital; among 1,200 lung cases, 72 were incorrectly diagnosed. Five of these proved to be primary carcinoma of the lung, so that one patient in every 250 diagnosed as tuberculosis had a primary carcinoma of the lung. Of those wrongly diagnosed, one in every fifteen had the disease. Eleven per cent of Ashe's 551 autopsies were not tuberculous; seven of these had a primary carcinoma of the lung.

We feel that no one of the symptoms or signs given above is diagnostic of primary carcinoma of the lung. But when a patient has dyspnea, deep dull chest pain with hemoptysis, and possibly some abnormal chest findings, we should consider malignancy of the lung.

SUMMARY OF CASES

CASE 1.

Female, age 58.

Admitting Diagnosis: Tuberculosis.

Complaint: Blood streaked sputum, pain in chest, and weakness.

Physical Examination: Few constant moist râles near hilus left lung and loss in weight, secondary anemia, blood-streaked sputum repeatedly negative for tuberculosis, negative Wassermann, hemoglobin 65 per cent.

X-ray: First examination negative; later agreed probably carcinoma.

Course: Lived twelve months.

Diagnosis: Primary carcinoma left lung.

Autopsy: Primary adeno-carcinoma left lung. Metastases: 1, Liver; 2, Pleura; 3, Bronchial, and 4, Mediastinal glands; 5, Adrenal; 6, Kidney.

CASE 2.

Male, age 46. Entered University Hospital September 16, 1920; died October 1, 1920.

Admitting Diagnosis: Weakness left arm and left leg.

Complaint: Weakness left arm and leg.

History: Stated about one year previous to entrance coughed and raised blood-stained sputum. In January, 1920, while working on farm, felt dizzy and next day felt well. Three days later noticed gradual and progressive weakness of left arm and then of left leg.

Physical Examination: Sluggish mentally, weakness left arm and left leg, pupils irregular and sluggish in reaction, papilledema of the fundus.

Chest: No movement, flatness of the entire left chest, tactile and vocal fremitus absent, interspaces bulged, and paravertebral dullness present.

X-ray: Probable carcinoma of lung.

Laboratory: Urine negative. Hg. 80 per cent, R. B. C. 4,800,000, W. B. C. 15,200, 90 per cent P. M. N., smear negative. Wassermann negative. Chest tap: clear fluid, 1008 sp. gr., 430 cells, 98 per cent lymphocytes.

Diagnosis: Primary carcinoma of the lung with brain metastases.

Autopsy: Primary carcinoma bronchi, complete atelectasis right lung. Metastases: Pleura, dura, right adrenal, pericardium.

CASE 3.

Male, age 49. Admitted to University Hospital January 5, 1921; died March 25, 1921.

Admitting Diagnosis: Asthma, aneurism or bronchiectasis.

Complaint: Pain in right chest, severe cough and bloody sputum, weakness, loss 50 pounds in weight.

History: Symptoms appeared six months previously.

Physical Examination: Chest: Lagging right side, decreased fremitus, relative dullness upper part anterior chest, some impaired resonance anterior posterior, breath sounds rough, expiration prolonged. Tracheal tug was present and

apex of heart displaced to left. Axillary gland removed and found to be inflammatory.

X-ray: Mass upper lobe right lung, apparently in contact with mediastinum. X-ray on February 17, 1921: Aortic type of heart, diffuse tuberculosis right lung, large mass thought to have been inflammatory. X-ray on March 17, 1921, findings simulated entrance x-ray examination. X-ray on March 24, 1921, showed pneumonia right upper and middle lobes.

Laboratory: Hg. 70 per cent, smear negative, urine negative. Blood smears show changes described by Downey & Habein. Wassermann negative, sputum repeatedly negative for tuberculosis.

Diagnosis: Carcinoma right lung, with abscess.

Autopsy: Primary carcinoma right bronchus. Metastases: Lung, pleura, lymph nodes, liver, adrenals, kidneys, thyroid.

CASE 4.

Male, age 40. Admitted to University Hospital March 18, 1921; died September 23, 1921.

Admitted Diagnosis: Pleurisy with effusion.

Complaint: Chest pain, dyspnea and weakness.

Physical Examination: Right chest fixed, flattened chest wall, dilatation of superficial veins, dulness on percussion over posterior chest from spine of the scapula down, fremitus diminished.

Laboratory: Hg. 56 per cent, W. B. C. 14,000. Smear as in Case 3. Wassermann negative. Urine negative. Tissue from pleural space negative. Tissue from external anterior chest wall proved to be carcinomatous tissue.

X-ray: 1. Probably bronchiectasis right and left lobes. 2. Before death, probably primary carcinoma bronchus with metastases.

Diagnosis: Primary carcinoma right lung.

Autopsy: Primary carcinoma right lung. Metastases right lung, pleura, diaphragm, liver, kidneys.

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DISCUSSION ON THE JOINT PAPER OF DRS. R. I. RIZER

AND H. C. HABEIN

DR. S. MARX WHITE, Minneapolis: This paper is very timely for the reason that the incidence of primary carcinoma of the lung is apparently increasing. It may be a matter of opinion whether it is because of better diagnosis, or whether the disease, like many other types of cancer, is on the increase. Certainly, better diagnoses play some part in the recorded increase of this condition; yet it is rather surprising to one who has been studying these conditions with care to be compelled to feel that he sees more of primary carcinoma of the lung than before. That has been my own experience. I have seen within the last three years considerably more cases of primary carcinoma of the lung than formerly.

Dr. Rizer mentioned certain points which are of considerable value in the clinical diagnosis of this disease.

I call attention again to the factors of deep pain in the chest and relatively early dyspnea. They are important symptoms of lung cancer. Hemoptysis is a sign which should receive attention and which should lead to a very careful study clinically and roentgenologically. Of course, today we feel that when a primary carcinoma of the lung has been diagnosed it is a hopeless situation. The methods of treatment of lung cancer by the surgeon have not yet been perfected, and it is only by careful attention to the possibility of cancer that one could recognize the disease in its earliest possible stage and be hopeful of successful surgical attack.

So far as other methods of cure, such as x-ray and radium, are concerned, we must certainly wait a considerable period of time before any judgment, except an unfavorable one, may be given.

DR. R. I. RIZER, Minneapolis (closing): As Dr. White brought out, primary carcinoma of the lung is rarely diagnosed early. Of the cases that have been operated on, most of them were diagnosed as bronchiectasis, chronic pulmonary abscess, or indurated pneumonia, and it would have been quite difficult pathologically to show cancer at the site where it was thought to be a bronchiectatic cavity. The repeated negative sputum examination I think is of great value, particularly as showing the absence of tubercle bacilli in a large number of cases. Of our series of cases and of those seen in other hospitals earlier, a diagnosis of tuberculosis or some other condition was made before we saw them. The repeated absence of tubercle bacilli in the sputum was one of the great helps in picking up these cases early.

Another point is the inability of the x-ray to diagnose them early. From a therapeutic standpoint, there are mighty few cases reported in the literature with any show

of success. Some men reported cures up to three years; they were not primarily diagnosed, but were operated for a lobectomy with the idea of having a bronchiectatic condition to deal with.

The x-ray apparently is going to help a great deal, particularly deep roentgen therapy and cross-firing. The greatest drawback to surgical intervention to my mind has been metastasis, which occurs so much earlier in the lung than in any other part of our anatomy.

THE EXAMINATION OF TEETH IN GROUP MEDICINE*

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The literature on dental subjects for the last few years does not give credit to the value of full mouth roentgenograms and the necessity of such examination apparently is not entirely appreciated either by the medical or the dental professions. Certain members of both professions still consider it quite ridiculous to examine, roentgenographically, the mouth of a patient wearing a full upper or lower denture. However, Eusterman's findings, in a study of roentgenograms of the mouth of 290 patients wearing either full or partial dentures, have demonstrated the importance of this phase of our work. Obviously a full mouth examination not only is necessary, but is the patient's due, if he is suffering from a systemic condition and a focus of infection is suspected. Besides this group of patients, are those who are undergoing thorough examinations from the standpoint of prevention of disease.

In diagnosing affections of the teeth, the existing pathologic condition should be visualized as it is when the teeth are removed surgically. The open view operation has made this possible since the exact condition may be seen, while with the older methods it is necessary to work more or less in the dark. For this reason it is important that the dental diagnostician should have surgical training.

If complete extraction is necessary and a full denture required, especially in elderly persons, it is well to explain carefully the probable results. Many patients are shocked by the change and regret having had the extraction. While the elimination of dental infection is of primary consideration, nevertheless the dental surgeon should keep in mind that the patients are to have dentures and that co-operation with the prothodontist should begin be-

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fore operation. In many instances preoperative models and facial measurements are advantageous.

It has been proved beyond doubt that a casual glance into the mouth with the idea of noting suspicious teeth, such as those supporting bridges and crowns, or holding large fillings, and so forth, is worthless. The deciding question is whether or not the clinician actually wishes to know if the teeth with their investing tissues are to be considered possible factors in the condition of the patient. This conclusion can only be reached after the examination of thousands of patients by full mouth roentgenograms. Residual roots, granulomas, and impacted teeth are often found under plates that have been worn for many years, and their removal has relieved many patients suffering from systemic disorders, particularly iritis, and one type of arthritis, neuritis, and so forth.

The roentgen-ray evidence should be carefully considered while the patient is under observation. The many advantages in checking up the clinical and roentgen-ray evidence at the same time cannot be over-estimated. The full mouth roentgenogram makes it possible to compare densities, which is just as necessary in dental work as in orthopedic work, when, for example, an abnormal condition of the right knee can best be demonstrated roentgenographically by a comparison with a normal left knee. Likewise in dentistry, the lower first molar may appear to be abnormal, but on comparison with the opposite first molar, one may be surprised to see that the condition is normal.

During the past year, approximately 28,000 patients were examined in the Dental Section of the Mayo Clinic. A review of the histories of these patients discloses ample evidence that the usual method of extraction is far from adequate. Residual roots and granulomas, as well as impacted and unerupted teeth were not infrequently found in supposed edentulous areas, as shown by Eusterman. Thirty per cent of these patients had roots, 4 per cent had impacted or unerupted teeth, and 3.5 per cent had residual granulomas. With the open view operation of extraction which is now known as alveolotomy it is practically impossible to overlook such conditions; this is proved by post-operative roentgenograms made routinely. The literature abounds in criticism of this method, yet when it is carried out with proper restrictions, the results are most satisfactory.

Physicians should encourage the routine examination of teeth except in hopeless or emergency

cases. Time is an important factor in emergency cases; however, the dental examination can be postponed until during convalescence after operation. The condition for which the patient is operated on need not necessarily be due to mouth infection to warrant the dental examination, but the elimination of such infection is of material aid in the after care of the patient, and in the prognosis.

Oral infection cannot be eliminated by extraction alone. Treatment for pyorrhea and thorough prophylaxis both are often necessary. Great care should be exercised with regard to the number of teeth extracted at one time, and the length of time between operations. This is also true of prophylactic treatments. There should be a limited amount of scaling at the first appointment and it should not be repeated for several days.

The profession of dentistry should be discouraged from making promises to patients as to the possible result following the extraction of teeth with evidence of infection. They need the co-operation of the physician and are only responsible for the field in which they work. An intelligent report with regard to the dental findings is desired from the dentist by the physician who should take the responsibility of advising and encouraging the patient as to the outcome of the dental treatment.

The dentist in making his report divides the teeth into two groups; those which should be removed for local reasons, and those which should be removed when systemic conditions warrant the procedure. Therefore, the removal of teeth in patients in the first group is a question for the dentist to decide, providing the patient's physical condition is such that he can stand the operation, and of those of the second for the physician. Teeth with marked evidence of infection at the roots, certain types of impactions, and teeth affected by pyorrhea to such an extent that treatment is of no avail, compose the first group. In the second group are listed pulpless teeth that are negative to the roentgen-ray, and their extraction is advised only when the systemic condition is traced to a focus. Thus many patients are allowed to retain pulpless teeth, which, however, should always be considered questionable. Therefore, to say that all pulpless teeth should be extracted is doubtless too radical at the present time.

CONCLUSIONS

1. It is necessary that the dental report shall be based on the roentgen ray, making use of full mouth pictures, and on clinical evidence.

2. Co-operation between the medical and dental professions is necessary in order that conclusions may be reached with regard to the teeth which should be sacrificed.

3. The dentist should be discouraged from making promises with regard to the outcome of extractions.

4. The extraction of teeth by simply pulling is not adequate or justifiable.

5. The results from the extractions of teeth by the method known as alveolotomy should be encouraged with proper restrictions.

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DISCUSSION

DR. M. R. COULTER, Mankato: It was with pleasure that I listened to this paper by Dr. Gardner. His relation with the Mayo Clinic gives him an opportunity to watch and record results in these cases which he has been interested in as a diagnostician.

He brings out the fact which we as dentists have overlooked to a great extent, that of the x-ray as an aid in a diagnosis of a case with an edentulous mouth. Our former methods of extraction were far from adequate and we left many granulomas, and diseased tissue which continued to throw off their toxins. The big problem in our diagnosis is that of determining which teeth shall be extracted and which shall be left. A very few years ago findings at the Clinic at Rochester brought out the fact that in many diseases of the human body all pulpless teeth should be extracted. That all pulpless teeth should be extracted went as an edict broadcast over the land. A majority of the dentists did not allow themselves to swing to the extreme. Many of our medical brothers still believe this extreme and our patients are coming to us and wanting certain teeth extracted because they were so ordered by their physicians.

Now, from Dr. Gardner's paper comes the statement that "it is doubtless too radical at the present time to say that all pulpless teeth should be extracted." We admit that there are cases of low vitality because of certain forms of disease which call for extreme treatment, and in these cases the removal of all pulpless teeth need not be questioned.

The dentist realizes that the teeth serve an important function as an essential factor of the digestive process and the teeth are not to be indiscriminately sacrificed simply as a precautionary measure against possible systemic complications or merely as a step in the process of diagnosis by exclusion or elimination.

The co-operation between the medical and dental professions is becoming less strained, as they become better acquainted with the fact that the dentist is not only a worker in mechanics but that he understands the underlying structures and many of the diseases with which they may become infected. The dentist should be so trained that his judgment relative to the immediate extraction of

pulpless teeth should be considered. He should be discouraged from making promises with regard to the outcome of extraction.

I would add that you of the medical profession must heed the admonition as well. In preventive medicine our work as dentists will be very valuable. Careful prophylactic treatment, including the treatment of pyorrhea followed by proper mechanical restorations, will do much to encourage health in our patients.

DR. THOMAS B. HARTZELL, Minneapolis: It is, indeed, a pleasant privilege to be able to congratulate Dr. Gardner on one of the best papers that has been written this year. His admonitions and conclusions are certainly in line with the present day thought in the matter under discussion, and his desire that everybody who has dental disease should have a complete radiographic examination of the jaws is exactly right. Partial examinations are only misleading, and I would like to urge that in all cases, after removal of diseased teeth, checking up of the work by a radiograph is necessary, and I believe most men will agree in a short time that it is important and should be done. Certainly, I have followed that practice. In addition to a complete x-ray examination, emphasis should be placed on the fact that in co-operating with medical men the dentist should have a complete diagnosis handed him with his patient, so that he may use better judgment in handling the case during his own operative intervention. If a dentist is advised to extract teeth by the physician without knowing what the physical condition of the patient is, he must rely on his own judgment, and his judgment cannot be complete without a good foundation laid by himself or by the physician. If the physician does not hand him this advice with the patient, he is under the necessity of making the diagnosis himself. I have employed a technician for some years at considerable expense, and I operate on no case without a proper and complete examination.

In regard to removing bone from the labial surfaces of the teeth in making extractions, I know that it is done under proper restrictions. As I understand it, the idea now is that we will not sacrifice the alveolar process of the jaws any more than is absolutely necessary. I am absolutely in accord with that proposition. There has been a phrase amongst dental operators for some two or three years back to peel back the periosteum, to traumatize the tissues and remove so much of the alveolar process that many of these patients have been unable to wear artificial dentures. Anyone who is robbed of his masticating organs and cannot wear an artificial denture is in an unhappy, uncomfortable position. Dr. Gardner cautions us, and it pleases me, because it is a step in the right direction. We do not want to sacrifice the alveolar process of jaws of patients who must subsequently wear artificial dentures.

I can only repeat what I said in the beginning of the discussion, that this is a valuable contribution to dental and medical literature.

DR. BOYD S. GARDNER, Rochester (closing): With reference to the remarks of Dr. Coulter, I know very well that many dentists and physicians are under the impression that we are advising the extraction of all pulpless teeth and doubtless they have based their opinion on one or two of our dental reports. I would like to correct this impression. We advise the extraction of all pulpless teeth only

when certain systemic conditions are present. I am sure that anyone who has had access to our dental report since we have established a dental section in the Mayo Clinic will bear me out. In every patient we consider all pulpless teeth as questionable and advise further examination.

OSTEOMYELITIS*

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Osteomyelitis is acute suppuration of bone and is sometimes called "bone furunculosis." It is always caused by pyogenic organisms. Most commonly the staphylococcus pyogenes aureus is found; less frequently the albus. Others occasionally found are the streptococcus pyogenes, B. coli communis and B. typhosus. The staphylococcus aureus produces cases with the most severe local and general symptoms. The streptococci localize in the denser bone cortex, epiphyses or periosteum. Typhoid infection usually locates in the cortex or subperiosteally.

Probably all of the so-called spontaneous cases of osteomyelitis originate from a primary focus, known or unknown, which allows the pyogenic organisms to enter the blood stream and locate at a point of lowered resistance, where their growth may take place. Then our bone pathology begins. The infective embolus usually localizes in the end artery in the diaphysis of a long bone—most frequently the tibia, next in frequency the femur and then other long bones—producing a localized area of necrosis. Owing to the fact that it is within dense bone, the inflammation spreads rapidly along the medullary canal and also through the Haversian canals and soon forms a subperiosteal collection of inflammatory products, elevating the periosteum; and the cortical bone, robbed of both its internal and external blood supply, dies. The extent of this necrosis depends on the virulence of the infective agent and promptness and effectiveness of early treatment.

The bony repair is brought about from within by the endosteum and from without by the periosteum and as a result the necrotic original shaft is separated from the sound portions of shaft by a soft spongy bone which later becomes dense and hard like cortical bone. The areas of new endosteal bone may be irregularly distributed and enclose small purulent areas, resulting in small abscesses with-

in this new bone. The whole becomes surrounded by a shell of periosteal bone—the involucrum—attached at either end to the remnant of the original shaft.

In the very early stage an opening into the marrow may reveal no pus, two or three days elapsing before it appears. Later there may be pus with oil drops of fat from the marrow. The cortex at first is white and shiny and may show small red vascular spots; at a later stage it is white and opaque without luster; still later when separated as a sequestrum it is brownish. The periosteum at first may appear as a thin fibrous membrane, in a few weeks becoming thicker and crackling either under pressure from the fingers or when perforated by an instrument. This later becomes thick and hard like a shell of new bone and may attain the size of the original bone. Secondary changes in the tissue surrounding the bone lesion may be abscess formation or chronic thickening due to scar tissue which results in considerable enlargement of the limb.

The patient—and it most frequently occurs in young adults, half the cases being from thirteen to seventeen years of age—gives a history of having had an infected finger, a boil, a carbuncle, influenza, tonsillitis, some one of the exanthemata, typhoid fever, and then, following some exposure to cold or local injury over a long bone about the time he is getting well from his illness or infection, has a pain in the neighborhood of a joint. This pain may be severe and come on suddenly with high temperature and delirium, or it may come on gradually as an ache, or he may merely complain of a limp. In either case the pain, temperature, accelerated pulse rate and the general disturbances due to the absorption of infective material become rapidly more marked. In a short time, but not at first, there may be swelling over the neighboring joint without that joint being involved.

On examination this patient presents the appearance of a severe illness; in the severe cases he looks septic. There will be a moderate or marked increase in the leucocyte count. X-ray is rarely of much value early. Superficial palpation in the neighborhood of the pain may reveal no tenderness, but prolonged deep pressure directly over the lesion produces intolerable pain. This is the essential sign in early acute osteomyelitis.

Articular rheumatism is the diagnosis commonly made for osteomyelitis. J. B. Murphy used to say, "The case is typical of osteomyelitis with the added

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evidence that a diagnosis of rheumatism has been made." Articular rheumatism usually affects multiple joints and there is swelling in the joint early whereas in osteomyelitis the swelling as a rule is a later sign and the pain in osteomyelitis is peri-articular, not intra-articular. The point of greatest tenderness to *deep*, not superficial, pressure, is in the bone above or below the joint. Movement in the joint is not painful as in rheumatism. In gonorrheal rheumatism, which may be a mono-articular lesion, the history is of special importance. The onset of constitutional symptoms is usually less severe. Gonococci can usually be cultivated from the joint. Tuberculosis of bone begins in the epiphysis—osteomyelitis, in the diaphysis. Osteomyelitis shows symptoms of acute infection with acute onset, and a leucocytosis. Tuberculosis of the bone never incapacitates a patient in one to two days.

I believe I would urge at least an exploratory opening into the bone marrow in any case in which osteomyelitis is a possible consideration. The early drainage in these cases so materially shortens the course that such a diagnostic puncture would be justified. In early cases a skin incision over the point of greatest tenderness will permit an opening to be made through the cortex of hard bone to the marrow cavity. Pus may not appear for some little time. This opening need not be large. A gimlet will make a sufficient opening. It is possible, if this drainage is done early enough, to prevent destruction of bone and sequestrum formation. In later cases with swelling, pus may be encountered in the soft parts or the periosteum will be elevated and pus found under it. A wide enough incision to insure free drainage is necessary. This drainage *must extend to the marrow cavity*. Rubber tube drainage is preferable. In cases with extensive bone destruction, traction and support are necessary, for pathologic fracture is likely. From weeks to months following drainage, sequestrotomy is performed.

The separation of the dead bone or sequestrum from the living is a function of living bone. Until nature has definitely indicated the limits of the dead bone, it would be meddlesome surgery to attempt to remove it. The time for removal of the sequestrum may be after weeks or months. Keene divides this operation into the following three classes:

1. Removal of the sequestrum while the periosteal bone is still plastic. This would be applicable

in the tibia when the fibula acts as a splint. The average time is about the eighth week after the institution of drainage. The time is more accurately determined by examination of the periosteal layer, which should be about one-sixteenth of an inch thick and show definite ossification. This method has the advantage of overcoming the difficulty in filling up the central cavity as in those cases of late removal of the sequestrum. By an incision through the periosteal involucrum the necrotic shaft is exposed and excised through healthy bone. The edges of this periosteal bone are sutured, leaving a flattened tube, which forms the new shaft. A sterile dressing is applied and the limb placed in plaster of Paris. Repair is complete in from five to eight months.

2. Removal of the sequestrum when no accessory bone splint is present, as soon as there is sufficient involucrum to carry on the function of the original shaft. Roughly speaking this operation is performed in about twelve weeks or when the x-ray shows the thickness of the involucrum to be one-half the diameter of the original shaft. The involucrum is soft and vascular. The sequestrum should be thoroughly removed. In favorable cases the involucrum will fill the cavity left by the sequestrum in about the same time as in the periosteal operation. There is danger of both shortening and deformity in this operation.

3. In cases in which the entire shaft is destroyed, the safest way is to leave the sequestrum for months—six, ten, twelve months—until a complete involucrum is formed. Then by a sufficiently wide opening through this involucrum completely remove the sequestrum. The cavity is sometimes difficult to fill. The removal of sufficient involucrum so as to invert skin and fascia flaps and fasten them to the bone is perhaps the most satisfactory method of obliterating the cavity.

Two cases will serve to illustrate the amount of bone destruction as determined by the promptness or delay in early treatment.

The first case is K. J., male, aged 19, office worker. Had scarlet fever at eight years of age, otherwise always well. Is an only child of healthy parents. He scratched his right index finger on Feb. 14, 1920. It became infected, was incised and drained for from five to six weeks. About April 1, as the finger was about healed, he began to limp in the left leg. At night the leg would pain, preventing sleep. During the next two weeks he had a fever up to 104 with some nausea and vomiting, during which time he received osteopathic treatment.

When first seen April 15th, patient complained of pain in left thigh, which was better when perfectly quiet, except

that when asleep the muscles would contract, causing severe pain. His color was sallow. He had lost considerable weight. General examination was negative. Left thigh showed a conical swelling over middle third, extremely sensitive to deep pressure. Hip and knee joints were normal. Hemoglobin 65 per cent, temperature 99.6, pulse 96, W.B.C. 10,400. X-ray revealed an area of necrosis in the middle third of the shaft of the left femur.

April 19th, a lateral incision was made over middle third of the left thigh through periosteum and cortex, which was necrotic. Tube drainage was instituted. On April 21st there was evidence of pathological fracture at juncture middle and upper thirds of the femur with usual deformity in this location due to pull of the adductor and psoas muscles. The leg was placed in a Thomas splint in an abducted position, but in spite of both traction and forced abduction an angular deformity obtained. Free drainage was maintained; temperature and pulse became normal in about two months.

Feb. 17, 1921, under gas-ether anesthesia sequestrotomy was performed and a rough sequestrum 1.5 inches in diameter by 8 inches in length was removed. The upper end of the lower fragment of the femur was thoroughly curetted. A layer of muscle was loosened and brought into the space and sutured. Three drains were placed; upper drain was removed in four weeks. Drainage still persists from the lower end of the wound due to an area of necrosis still present. The patient is up on crutches; his general health is very good. Passive and active movements have softened up the thigh muscles. Flexion of knee obtains to an angle of 45 degrees. There is shortening of about 2 inches. This patient has been incapacitated for twenty months.

Contrast this case, treated late, with the following case in which treatment was instituted fairly early:

Second case, F. D., an eleven-year-old school boy, who has had chickenpox and measles, but otherwise was always well. The latter part of March, 1921, he fell and skinned his right knee. Pimples formed over the bruised area out of which pus was squeezed. During the next two to three weeks, there was much pain and fever, for the relief of which hot applications and osteopathy were employed.

He was first seen May 9th, when general and local signs pointed to an osteomyelitis of the right femur with almost as extensive bone destruction as the former case. This was immediately drained by deep incision. On May 13th patient complained of an ache in right shoulder and across his chest. He had some cough. His parents thought he had a cold. By evening the pain in the shoulder was severe. Temperature 104, pulse 120. There was an extremely painful area just below the right shoulder joint on prolonged pressure. W.B.C. 23,000. For some reason incision was delayed until morning, when there was some swelling over the shoulder. Incision through the deltoid, periosteum and cortex liberated a small amount of pus. This opening was drained with a tube.

November 2nd sequestrotomy was performed on both the right femur and the right humerus. From the humerus a small sequestrum about 1 inch in length was removed and the small cavity thoroughly cleaned out. This is already filling in.

In the first case there was a delay of about nine-

teen days following the onset of osteomyelitis before the femur was drained. In the second case there was a delay of twelve hours after the diagnosis was made.

In the first case almost the entire shaft of the femur was destroyed. In the second case a very small sequestrum resulted and the sequestrum formation might have been avoided by establishing drainage twelve hours earlier.

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DISCUSSION

DR. C. A. REED, Minneapolis: Dr. Allen has given us an excellent paper. I was particularly pleased with the stress he placed on the subject of idiopathic or hematogenous osteomyelitis. It might be said that diagnosis is almost the whole problem in acute osteomyelitis, while treatment is the problem in chronic osteomyelitis. The diagnosis must be made, ordinarily, by the general practitioner or pediatrician. They rarely ever get to the surgeon until the diagnosis is made. Although we are constantly warned to be on the lookout for this disease, it is often several days before it is recognized. In a recent report on thirty-nine cases in a metropolitan hospital, the average time before a diagnosis was made was eleven days. It is well for us to have this subject of acute osteomyelitis reviewed often, so that we may keep it constantly in mind.

I wish to call your attention to certain types of osteomyelitis in which the diagnosis is not so easy and simple.

First, there is a non-suppurative type which is quite rare. This may start as a very acute condition and yet never go on to suppuration. I have in mind a case of a fourteen-year-old boy who was taken very sick with high fever and pain in the region of the hip. He was not sent to the hospital for several weeks. When we first saw him, he had some pain in the hip but no local tenderness or limitation of motion. He was very septic and was running a high temperature. X-ray of the hip showed slight changes from the normal in the head of the femur. These changes became much more distinct in a couple of weeks and both the head of the femur and the hip joint were explored. No gross pathology was found and no growth from smears. Later, the x-ray showed the same condition in the clavicle. This became much enlarged and of a markedly honey-combed appearance. It never went on to suppuration. The temperature finally reached normal after a few weeks and the pain left.

Acute epiphysitis can at times cause confusion in diagnosis. A few weeks ago, I was sent a case with acute pain, temperature of 101 to 102 over a period of ten days to two weeks and swelling over the lower end of the femur. X-ray showed changes in the epiphysis. In this case, an opening was made through the lower end of shaft down into the epiphysis without opening the knee joint. The knee joint showed pus on aspiration. The joint was washed

out through an aspirating needle and the irrigation repeated in three days. The whole condition then cleared up.

Another condition which should be kept in mind is multiple osteomyelitis. This is especially confusing in a case which has been operated and which seems to develop a relapse. Everything seems to point to the fact that there is dammed up pus somewhere in the wound. It may turn out to be an infection of another bone.

DR. WILLIAM VON DER WEYER, St. Paul: I have enjoyed Dr. Allen's interesting paper, and think he has covered the subject quite thoroughly. I only wish to emphasize that early diagnosis and the institution of early operative procedure is essential: first, for the elimination of septic products, which are liable to cause a septicemia with serious consequences; second, for prevention of joint involvement and of bone destruction with its consequent deformity; and third, for the prevention of the development of a chronic osteomyelitis, which to my mind is one of the most difficult diseases with which the surgeon has to cope.

There is no doubt that diagnosis of the acute disease, at its most favorable period for treatment, is difficult, because of the usual proximity to the joint. The disease in children starts in the epiphysis and (1) it may remain as a simple epiphysitis or (2) it may go down into the medullary canal or (3) it may go about the epiphysis beneath the periosteum and (4) finally may go through the epiphysis into the joint. The important symptom is extreme local pain, experienced usually in the epiphyseal end of a long bone in children, especially on deep pressure with added general systemic symptoms, which condition warrants immediate operation. A wide open soft tissue incision down to the periosteum should be made, with one or several holes bored through into the medullary canal at the epiphyseal end of the bone or into the epiphysis for drainage. The bone structure here will be found to be soft. Pus may not be encountered, but when it is found, greater drainage is necessary and can be accomplished by removing a portion of the cortex of the area. Wick drains should then be lightly placed to the bone and gauze packs placed in the upper end of the wound in order to keep the soft tissues widely separated. Cleansing irrigations of either Dakin's or boric solution are valuable.

It is essential as a means of prevention against joint involvement, or, as an aid, should joint involvement already be present, to immobilize the limb by splints or by plaster of Paris casts.

X-rays show nothing in the acute stage, but give evidence of irregularity and changes in the epiphysis early. Later, it is very valuable in determining the formation of sequestrum and involucrum. I do not believe a sequestrum should be removed until it is entirely free. As most of these cases are in a rundown, anemic condition, it is advisable to institute, aside from the local, also a vigorous constitutional treatment.

DR. C. C. ALLEN, Austin (closing): I am glad Dr. Von Der Weyer went into more detail in regard to the drainage of these cases, and I am also glad Dr. Reed discussed a little more thoroughly the diagnosis of some of the more obscure types of bone lesions. My experience has been with the acute cases, although I have not been lucky in seeing them early.

In the second case in which there was metastatic infection, there was some oversight. I have forgotten whether there was objection on part of the parents or whether there was some hesitation on my part, but there was a delay in drainage of twelve hours. The important thing, as Dr. Reed suggested, is that in these acute cases, if seen and diagnosed at once, early drainage will materially shorten the course and the amount of bone destruction. We have all perhaps remembered more or less the course of these cases, but unless we continually review them, we will slip up on the early diagnosis, particularly at a time when it will do the patient the most good.

PREMENOPAUSIC UTERINE PROLAPSE*

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The many methods devised for the correction of the pathologic conditions under consideration certainly merit a review, with the understanding that, while nothing new will be added, certain fundamentals will be emphasized, that we may arrive more nearly at a standard of perfection.

When the organs of reproduction have passed the period of procreation, and have ceased to function, we have then to deal with a pathologic entity, which frequently taxes the skill of the surgeon to its utmost. Some of our cases will return with a secondary procidentia.

The interposition operation (Watkins¹, Wertheim²) is the one most frequently done, providing the uterus is firm, the best results being obtained at or about the climacteric period. When the uterus is atrophied, or soft, one may resort to an abdominal hysterectomy, including the ovaries and tubes in the removal, anchoring the cervix to the broad and round ligaments. The Murphy modification of the Kocher³ operation has proven very satisfactory in this type of cases. In the cases where none of the above mentioned methods are advisable, the "vagina-pelvic fixation operation (Mayo⁴) is the most satisfactory method.

In dealing with a prolapse during the premenopausal period, when the organs of reproduction are still active, our problem is vastly more complex. It is then not alone necessary to conserve the function of reproduction, but we must repair the pathologic condition, in order that we may correct the disturbed circulation which normally supplies the uterus and ovaries, thereby re-establishing the chemistry of the internal secretions. The endocrines

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unquestionably play an important role in the general welfare of the patients.

Etiologic Factors of Prolapse.—One encounters a greatly varied condition of prolapse. The uterus begins to descend when the levator-ani muscle, sacro-uterine, and pubo-cervical ligaments have given way, allowing a constant dragging on the broad ligaments, which finally become stretched to such an extent that a complete procidentia results. If the body of the uterus is retained by its broad ligament attachments, the cervical portion of the uterus may become elongated, frequently passing well beyond the vaginal outlet, carrying with it the cystic wall, and giving all the symptoms of complete prolapse.

The uterus, in its normal position, is moved in a somewhat circular path in the plane of the broad ligaments. The round ligaments act as supports to keep the body of the uterus from traveling beyond this circular plane. The pubo-cervical fascia, or ligaments, act as a fulcrum, while the levator-ani and sacro-uterine, guide the cervix and limit its motion. The direction of travel of the uterus is very easily demonstrated by carrying it backward with an ordinary dressing forceps through a bivalve speculum in the vagina.

We know, clinically, that laceration of the perineum itself is not always productive of prolapse. Many a woman who has borne children and has been lacerated, is going about with no more trouble than a rectocele. However, lacerations, or relaxations, of the pubo-uterine fascia will invariably result in prolapse of the bladder and the uterus. The most frequent causes assigned to this condition are rapid succession of child-birth, and the improper application of forceps. These are contributing factors producing this pathology, through laceration and relaxation of the pelvic outlet.

The true etiology begins with the developing young woman when the bony structure of the pelvis is passing through the period of adolescence. It constitutes the greatest factor in our pathology of women during the child-bearing period. Mothers, always proud of the physical development of their sons, have little concern for the development of their daughters. They little realize its importance to them in their future welfare. Our public playgrounds and gymnasiums are as essential for the girls as they are for the boys, for the real mother of tomorrow should be the athletic girl of today.

Lacerations of the supports of the pelvis during

child-birth are the results of contractions of the bony pelvic outlet. The relationship in the dimensions of the anterior and posterior segments of the sagittal line, to the transverse diameter of the outlet, will decide whether the head will be delivered at the expense of the anterior supporting structure, or of the posterior structures of the outlet. When the head, at birth, is directed against the posterior support and lacerations ensue, the separation will be productive of a rectocele. A deflection of the head toward the anterior segment, with the resultant laceration of the fulcrum of the uterus, will produce a cystocele and prolapse.

Disturbances of Circulation.—The blood supply of the organs of reproduction comes chiefly from the uterine which branches from the internal iliac artery, and the ovarian, branching from the aorta just above its bifurcation. These blood vessels anastomose frequently, and are remarkable for their tortuous course. They reach the various organs through the broad ligaments.

From the study of Sampson⁵ on the potential supply of blood to the ovary, we learn that the actual blood supply is both ovarian and uterine. The fallopian tubes and uterus are both supplied from the same source. The veins of these organs are unusually large. When women have borne children and have suffered lacerations because of a defective pelvic outlet, with a resultant prolapse, many of the symptoms complained of are produced through disturbances of circulation in the pelvic organs. A prolapsed uterus may produce symptoms of backache, frequency of micturition, a feeling of pressure, and abdominal pain, with tenderness upon examination, which is produced through the venous congestion of these pelvic organs through traction upon the broad ligaments. The cardiac impulse sends the blood through the anastomosing arterial vessels, but the venous circulation becomes retarded, and the uterus becomes engorged and heavy.

The interference in the circulation of the ovary is productive of cystic degeneration and disturbances of the internal secretions, making neurasthenics of many women. Temporary relief may be afforded through replacement and support of the uterus by a pessary, until the circulation becomes re-established and the congestion is reduced.

Treatment of Prolapse During the Childbearing Period.—The use of the pessary must be condemned for the treatment of these conditions, except as previously mentioned, for a temporary support of

the uterus, and for the reestablishment of the uterine circulation.

In considering the conservative methods of treatment, we must be certain that we are dealing with a fairly normal uterus. Any pathologic condition which would lead to later complications, such as multiple fibromata, suspicion of malignancy, or periuterine inflammation with metro-rhagia, necessitates a more radical surgical measure.

We have learned that the various suspension operations so frequently practiced a few years back, were of no permanent value. The ventro-suspension and ventro-fixation methods of repair have no further value than a pessary would have, for they act only as temporary supports. The shortening of the round ligaments, whether internal, such as the Gilliam, or the external, as originated by Alexander, retains the body of the uterus within its plane, but offers no support. The external operation should be the operation of choice when it is necessary to shorten the ligaments. The internal operation is often followed by pelvic distress.

The importance of the cervix as an adjunct in the support of the body of the uterus in the proper plane, is not generally recognized. The high amputation so often practiced immediately makes the ligaments of the body of the uterus the supporting structure, and the function of the utero-sacral ligaments is destroyed. In amputating an elongated cervix, we must recognize the importance of a surface of sufficient length remaining to act as a support beneath the pelvic floor, which is the real support. Avoid amputation too near the internal os.

Perineal restoration is necessary, no matter what method is followed for the repair of prolapse. The approximation of the mesial edges of the levator-ani muscles is essential for its success.

The proper repair of the anterior supporting ligaments is frequently overlooked, for we have concern only for the cystocele. Unless the uterus is firmly fixed at this point, we shall fail in our efforts to repair. The imbrication of the fibro-muscular tissue forming the base of the broad ligaments on the anterior surface of the uterus will give a satisfactory result.

By making a T-shaped incision in the anterior vaginal wall, and dissecting the flap backward by blunt gauze dissection, separating the bladder from the uterus as high as is necessary to expose the bases of the broad ligaments, the fibro-muscular tissue may be approximated in the median line with a continuous catgut suture. When the point of

fixation is established, the bladder is carried up with a flat retractor, and the operation is completed with the suturing of the vaginal flaps. It may be necessary to shorten the round ligaments in order to carry the body of the uterus above the newly constructed bridge.

Prolapse of the uterus, during the premenopausal period, must be so treated that the child-bearing function will not be destroyed. This condition should be corrected so that the circulation may be restored, thus enabling the internal secretions to properly function, protecting women from a state of semi-invalidism.

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NONTUBERCULOUS INFECTION OF THE LUNGS*

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I have selected for this review twenty-eight cases of nontuberculous infection of the lungs in which accurate data have been compiled. This number was chosen from a larger series of cases observed in the Mayo Clinic during the period from March, 1920, to December, 1921. This condition has ordinarily been diagnosed clinically as pulmonary tuberculosis or bronchitis. Various authors have named the condition: a lobar type of bronchopneumonia²⁰, a localized subacute form of bronchopneumonia¹², chronic progressive influenza¹³, and, nontuberculous lung infection^{6,7,9}. I shall report three cases in detail as illustrative of the findings in my twenty-eight cases.

REPORT OF CASES

CASE 1 (A309858). Mrs. O. P. S., aged thirty years, came to the Clinic in March, 1920. The patient had had diphtheria at twenty years, recurrent attacks of tonsillitis, and, in November, 1918, she was in bed three weeks with influenza. During this illness she developed a cough which persisted to the time of examination here. Coughing, which was most persistent in the morning, was more severe during winter and inclement weather and when she was harboring slight infections, such as a "cold," to which she was easily subject. The sputum consisted of a yellowish material and was never profuse. Examination of the sputum

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elsewhere had failed to reveal bacilli of tuberculosis and a diagnosis of chronic bronchitis had been made.

Examination revealed the blood pressure to be 120 systolic and 70 diastolic; the pulse rate was 72 and the temperature varied from 99 to 98.6. Moist râles were noted at the bases of both lungs, especially abundant on the left. Roentgenograms of the chest showed bronchial infiltration in the right upper lobe, suspicious for tuberculosis. The tonsils were shown to be fibrous with some plugs. The fingers were not clubbed. She was given creosote inhalations with beechwood creosote internally.

The patient was re-examined September 15, 1921. The cough had continued persistent, as much as a quarter of a tablespoonful of yellow pus being raised at one time. Her condition was much the same as at her previous examination and her general health had not depreciated.

Examination of the sputum was negative for bacilli of tuberculosis. Diagnosis was made of chronic bronchitis with nontuberculous infection of the lung, especially in the left base, and very slight bronchiectasis.

CASE 2 (A372663). Miss H. B. aged sixteen years, came to the Clinic September 20, 1921, complaining of chronic cough, impaired hearing for five years, and a feeling of being tired. She had had pneumonia in 1909, 1915, and 1918, tonsillitis in 1916, and influenza in 1919. The tonsils and adenoids had been removed in 1920. During her first attack of pneumonia she was very ill in bed for two weeks, following which she developed a chronic cough with expectoration of a yellowish material and a discharge from the nose which persisted to the time of examination here. In 1915 and again in 1918, she developed pneumonia, in 1915 following an attack of measles. During the last two years the cough had become nonproductive until just previous to examination here, when she again began expectorating yellowish material. Expectoration did not reach a maximum at any particular time. The patient "caught cold" easily. There had been no loss of weight, no night sweats, hoarseness, pleurisy, or dyspnea. For a period of six weeks in 1920 she had marked malaise, slight fever, and some loss in appetite and strength. Since childhood she had had severe frontal headaches which came on without cause and were accompanied by a cessation of the nasal secretion. The headaches subsided when the nasal secretions again began to flow.

Examination revealed a rather dull appearing girl with nasal obstruction and snuffles. Her temperature ranged from 98.4 to 99 and the pulse rate varied from 116 to 108. The blood pressure was 112 systolic and 78 diastolic. The fingers were not clubbed. Examination of the heart was negative. On inversion and cough only a small amount of sputum was recovered. There were a few scattered moist râles, but at a later examination on prolonged inversion a moderate number of moist râles were heard in the right base. Examination of the sputum was persistently negative for bacilli of tuberculosis. Sphenoid sinusitis and bilateral maxillary sinusitis were present. The blood showed hemoglobin 65 per cent, 12,800 leukocytes, and 3,910,000 erythrocytes. Roentgenograms of the chest revealed apparently healed tuberculosis of both upper lobes.

Diagnosis was nontuberculous infection of the lung with mild bronchiectasis. The patient was treated by inversion four times a day with beechwood creosote inhalations and beechwood creosote internally. The disease of the sinuses

was cared for surgically. Observation has not been sufficiently extended to warrant a statement of the results.

CASE 3 (A292384). Mrs. E. M. aged twenty-eight years, came to the Clinic April 10, 1920, complaining of persistent cough and pain in the right thoracic region following an attack of influenza. She had had pneumonia three times, influenza, pleurisy, infection of the antrum, and tonsillitis. The cough developed slowly with gradually increasing severity and frequency, was more troublesome in the morning, and was aggravated by change of position. Sputum, which was expectorated mostly in the morning, was yellowish, rather profuse, and occasionally streaked with blood; there were no frank hemorrhages at any time. Examination of the sputum elsewhere had been negative for bacilli of tuberculosis. There had been some loss of weight, strength, and appetite, and a slight fever. She had had severe pleurisy in the left side of the chest during the attack of influenza and had complained of pain in this region for ten years. There had been some shortness of breath, not asthmatic in type. She had always "caught cold" easily and had had marked nasal catarrh. Her ability to work had been interfered with, but she did not go to bed.

Examination revealed the pulse rate to be 96, temperature 99.4, systolic blood pressure 118 and diastolic blood pressure 78. The fingers were not clubbed. There were abundant moist râles in the right base. Roentgenograms of the chest indicated old tuberculosis in the right apex; roentgenograms of the sinuses were negative. Examination of the nose and throat did not reveal evidence of disease.

The patient was re-examined in December, 1920. She said that the cough had improved when she went home and that expectoration had been slight until six weeks before, when she took cold. Since then, cough and expectoration had been marked. The pain in the left chest had almost subsided. At examination, the area at the left base still showed some evidence of the old condition, but it seemed to be much improved. The cough had entirely subsided by November, 1921.

MAYO CLINIC SERIES

Seasonal incidence.—In most of our cases the disease developed during the colder months; sixteen cases developed during the period from October to April, while only six developed from May to September. The others were indefinite as to time of onset.

Geographical location.—The fact that only three of our patients lived in the South may be of significance, although unquestionably the larger percentage of our registrants come from the North.

Family history.—There was a family history of tuberculosis in eight of our cases, while a similar cough was present in another member of the family in six instances; but only once did I see two patients from the same family. Miller reports in two instances two cases from the same family. Field reports one such instance. In the cases cited by Miller one followed the other, thus indicating direct contagion.

Previous disease.—In most instances the infection followed an acute cold, influenza, or pneumonia. A tendency to "catch cold" easily was quite marked and occurred in twenty-two of our cases. Of minor significance were whooping-cough, measles, scarlet fever, pleurisy, simple grippe, croup, and childbirth.

Accompanying diseases.—Twenty-one patients complained of nasal catarrh, and thirteen showed various nasal abnormalities at examination. Adenoids were noted in only one case, probably because nearly all the patients were adults. Definite sinus disease was found in six of our cases, while in eight there was a history of previous sinus disease. Field states that sinus disease was present in three of his eight cases. Some degree of tonsillitis was found in eight of our cases, and in three others the tonsils had been removed previous to examination here.

Deformity of the chest.—Thoracic deformity was mentioned in only one of our cases, while Field did not find this condition in any of his reported cases.

Bacteriology.—*Bacillus tuberculosis* was absent in all cases in this series and those in the literature. In eleven of our cases the sputum had not been examined previously, while in seventeen it had been found negative for tuberculosis. In 1902, Lord¹² reported twenty-nine cases in which there were cough and purulent expectoration. Eighteen of these cases were chronic. He studied 100 unselected cases of cough bacteriologically, and was able to demonstrate bacilli of influenza in more or less pure culture in these twenty-nine. Many of his cases were of a type usually classified as chronic bronchitis or tuberculosis. Some of his cases are unquestionably identical with ours. Lord¹³ reported further studies in these cases in 1905. Hamman and Wolman, who dealt with a series of twelve cases practically identical with ours, found that the pneumococcus was most often predominant, next the bacillus of influenza, and lastly the streptococcus. Garvin, Lyall, and Morita, who dealt with eight such cases, found the bacillus of influenza in seven of the eight, predominating in four, and secondary in three. Miller, who reported twenty-two cases which he divided into subacute, subacute with exacerbations, and chronic, found pneumococcus Type IV predominating in ten, the bacillus of influenza in eight, and *Streptococcus viridans* in three. In his seven chronic cases alone, those which correspond to the Mayo Clinic series, the pneumococcus Type IV predominated in four, *Streptococcus viri-*

dans in two, and bacillus of influenza in one; in one case pneumococcus Type IV was predominant in one culture, but a later culture showed predominance of the bacillus of influenza. In Field's cases the bacillus of influenza was predominant in one, *Streptococcus pyogenes* in three, and *Staphylococcus albus* in four. Bossert and Leichtentritt report twenty-four cases which they call "chronic progressive influenza." Their cases resemble ours in some respects. The bacillus of influenza predominated in all their cases. Recently, Greely and Brereton reported cultures of *Aspergillus fumigatus*, *Mucor corymbifer*, and *Penicillium glaucum* obtained from non-tuberculous infections in the lung, but they apparently were not dealing with the type of case reported in my series. No attempt was made toward a systematic bacteriologic study of our cases, but in those cultured, the pneumococcus Type IV, *Streptococcus viridans*, *Streptococcus hemolyticus*, and *Micrococcus catarrhalis* were found predominant. *Aspergillus* was cultivated from one specimen of sputum. Herbst, Elliott, Radin, Hawes, Niles, Lyter, and Butler have also observed similar cases.

Age and sex.—The twenty-eight patients comprising this series ranged from ten to seventy-five years of age with an average age of thirty-nine and seventenths years. The disease began in three of Field's eight cases before the age of six; two patients developed the condition at thirteen and three at twenty. Four of Miller's seven patients whose condition was chronic were more than thirty. Riesman reported seven cases which, however, were of the subacute rather than the chronic variety. His patients were between six and nineteen. Larrabee's cases, in symptoms, signs, and location of the lesion, resembled those of Riesman. The patients varied in age from ten to seventy-five years. From the literature and from our own cases, it may be assumed that the chronic type of case occurs oftener in advanced life, the subacute type oftener in earlier life.

Our cases are almost equally divided as to sex, thirteen males and fifteen females. In Miller's series of twenty-two patients, including all types of cases, there were eight males and fourteen females, while in the seven chronic cases the sexes were more equally divided.

Pathology.—There has been no opportunity in our cases to study the pathology, since none of the patients are known to be dead. Necropsy was performed in one case of Hamman and Wolman; the bronchi of both lower lobes were dilated and filled

with purulent material, and around the dilated bronchi were scattered areas of bronchopneumonia. Lord¹³ examined at necropsy one case of forty-four years' duration in which there was slight generalized bronchiectasis with many small areas of interstitial pneumonia. Judging from the physical signs, one would usually expect to find localized bronchitis and bronchiolitis with some dilatation surrounded by small areas of bronchopneumonia and fibrosis, but not sufficient to give signs of consolidation or to produce a good shadow in roentgenogram.

SYMPTOMS

Cough.—By far the most common symptoms are expectoration and cough over a prolonged period, both occurring either constantly or in attacks lasting a number of days, weeks, or months. All but two of our cases presented these symptoms. In the majority of cases cough was most marked on arising and sometimes on retiring, while paroxysms of cough on stooping, such as are often seen in bronchiectasis, occurred in only a few instances. In most cases the cough was chronic but increased in severity in the winter. The influence of climate has been variable, only four of our nine patients who moved to a milder climate noticed any benefit.

Expectoration.—The sputum was usually mucopurulent, yellow or yellowish green, and either small or considerable in amount. However, large amounts were not expectorated at one time, as in bronchiectasis. Sometimes the sputum was streaked with blood and in six of our cases there was definite hemoptysis; in one case as much as a quart of blood was said to be expectorated. In only three cases was the sputum described as of foul odor, while in four others slight odor was noted. It was not of the thin consistency of the sputum of frank cases of bronchiectasis and did not settle into layers on standing.

Pleurisy.—Fourteen of our patients gave histories of so-called pleuritic attacks, but these were not by any means always typical. The complaint of indefinite pains in the chest was not uncommon.

Constitutional symptoms.—As a rule there was very little fever. In the twelve patients with histories of fever it usually occurred for a period of a few days, coinciding with an acute "cold," with the symptoms of acute coryza, and with an exacerbation of the cough. In one of our cases almost the only complaint was recurrent attacks of fever with little or no cough or expectoration. An area

in the left base near the angle of the scapula presented the typical physical signs of the disease under discussion. Riesman emphasized the idea that this type of infection may be the cause of obscure fever. Twenty of our patients had symptoms sufficient at times to interfere with work; eleven were at times confined to bed.

A history of chills or chilly sensations was given in nine of our cases. Some loss of weight was noted in fifteen, decrease of appetite in sixteen, decrease of strength and energy in nineteen, and night sweats in ten. Usually, none of these symptoms were marked and the patients usually appeared in good general health.

Asthma.—Asthmatic symptoms, sometimes slight, usually not characteristic, occurred in six of our cases, while some dyspnea on exertion was present in nine.

CLINICAL EXAMINATION

The general appearance of the patient was usually good, but sometimes there was a mild anemia, as shown in five of our cases. Some patients had slight curvature of the nails, somewhat resembling the "watch crystal" nails of bronchiectasis or other pulmonary suppuration, but I have not seen any instances of clubbed fingers, which is so prominent a feature in the picture of bronchiectasis.

Inspection of the chest usually produced nothing suggestive, although lessened expansion of the portion involved sometimes occurred or occasionally a poor or absent Litten's sign on the affected side. The physical signs were located in the right base in eight cases, in the left base in six, in both bases in eight, and in the entire right lung and base of left lung in one. They were fairly well generalized in four cases and the location was not stated in one.

The principal feature of the physical examination was the presence of more or less abundant moist râles, sometimes accompanied by sibilant and sonorous râles. The râles were present mostly during inspiration, sometimes only on deep inspiration, and were often increased by cough or the "expiration-cough-inspiration" method of bringing out râles in cases of tuberculosis. Such râles were present at some time during observation in all of our patients. Occasionally, the râles may be heard over the whole of one lung and often occur in "showers." Sometimes the râles may be brought out by examination after the patient has been in the inverted position for a few minutes, that is, with the head much lower than the hips. Dimin-

ished resonance is noted in some of the cases while in others there is no change in the percussion note. Harsh or diminished breath sounds occurred in some of the cases, but true bronchial breathing and the associated signs of consolidation did not appear. Dyspnea at examination was not noted in any considerable number of our cases. Cyanosis was not observed.

The temperature at examination varied from 98° to 101.8°, the pulse from 60 to 130, with an average of 91. The blood pressure in adults varied from 98 to 200 systolic, averaging 127, and from 56 to 104 diastolic, averaging 69.

A leukocyte count from 9,000 to 14,500 was found in twelve of our cases, while a count of 6,000 or less was found in seven. The remainder of the cases were within the normal limits of 6,000 to 9,000.

Roentgen ray.—In most of our cases the roentgenograms were reported negative. Tuberculosis in one or both upper lobes was reported in several instances. Miller found some increase in the pulmonary markings in six of the seven chronic cases. In none of our cases were the roentgen-ray signs of tuberculosis shown in the area presenting the physical signs. In several cases, however, tuberculosis was diagnosed roentgenographically in another area which did not agree with the physical and bacteriologic examination.

In ten instances the patient was not cognizant of a diagnosis previous to our examination; in eleven the diagnosis was chronic bronchitis and in three tuberculosis, and in none of the cases in which a diagnosis of tuberculosis had been made did we find a roentgen-ray evidence of the disease.

DIAGNOSIS

The chief points in the diagnosis of nontuberculous infection of the lungs are: (1) Cough for a prolonged period either constant or with exacerbations; (2) little depreciation of general health; (3) little, if any, fever and if present, intermittent; (4) lack of progression of the disease; (5) the lesion usually located in the base of the lung, and (6) absence of bacilli of tuberculosis in the sputum.

DIFFERENTIAL DIAGNOSIS

Nontuberculous infection of the lungs may be distinguished from tuberculous infection mainly by the location of the lesion in the base, by the less marked or absent depreciation in health, by lack of progression, and by the absence of bacilli of tuberculosis. Often there is leukocytosis. In at

least nine of ten cases of tuberculosis the infection is found in the upper lobes or apices, while almost the reverse is true of these cases. Recently Rosenblatt reported that in 1,000 cases of tuberculosis only three were primarily in the base of the lung. Seventeen of eighteen patients presenting basilar lesions admitted to the Bedford Hill sanitarium with the diagnosis of tuberculosis were found to be nontuberculous. In this connection, it is well to remember the dictum of Brown that "Abnormal physical signs at one apex should be considered as due to pulmonary tuberculosis until proved not to be; while those at the base should be looked upon as not tuberculous until definitely proved so."

Nontuberculous infection of the lungs is differentiated from simple chronic bronchitis by the fact that chronic bronchitis is usually generalized, is often secondary to cardiac or other disease, has less tendency to the production of purulent sputum, usually does not cause exacerbation of symptoms with temperature, and usually produces no leukocytosis. Moreover, in simple bronchitis the râles are predominantly dry, while in this condition they are predominantly moist.

Bronchiectasis may usually be distinguished from nontuberculous infection of the lungs by clubbed fingers and more abundant foul sputum brought up by paroxysms of cough. Cough and expectoration are usually markedly affected by changes of position, such as lying and stooping. The cough in bronchiectasis is typically loose and a copious amount of the sputum can usually be produced by inversion. On standing, the sputum often separates into three layers. There is usually no leukocytosis in bronchiectasis.

Bronchopneumonia is usually bilateral, acute, and not recurrent, while this condition is chronic, often unilateral, and recurrent. In bronchopneumonia there are usually some signs of consolidation, while in this condition such evidence is usually absent.

PROGNOSIS

In adults the prognosis must be very guarded, as it is likely that the condition will persist or recur. It seems quite probable that most of these patients will develop a true bronchiectasis if the infection persists. In children the prognosis is somewhat better, according to most authors, although I have not had much experience with such cases.

TREATMENT

Garvin, Lyall, and Morita were the first to emphasize the value of postural treatment, by inver-

sion of the body at least four times daily for a ten or fifteen minute period. This may be done by the patient's kneeling on a chair with the hands on the floor, by assuming the Trendelenburg or reversed Trendelenburg position, or even by hanging the body over the edge of the bed. The more nearly the patient assumes the perpendicular inverted position, the better the drainage usually is. Most of our patients were given steam inhalations with creosote or benzoin two to four times daily; in some instances beechwood creosote was given internally as well. General hygienic measures such as open air, sunlight, appropriate diet, and moderate exercise should be instituted.

CONCLUSIONS

1. Nontuberculous infection of the lung is a nonspecific disease which, however, deserves a name as a separate disease entity.

2. The essential features are cough, marked chronicity, exacerbations, little or no fever, and few other constitutional symptoms, usually purulent expectoration, lack of progression, and location of the lesion almost always in bases.

3. The principal physical sign is moist râles.

4. Diagnosis is made mainly by chronicity of cough, little effect on general health, location of signs in bases, and persistent absence of bacilli of tuberculosis.

5. In the differential diagnosis chronic bronchitis, tuberculosis, frank bronchiectasis, and bronchopneumonia must be considered.

6. Prognosis must be guarded in adults.

7. Treatment is mainly by posture.

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EXPERIENCES IN THE FEEDING OF WHOLE LACTIC MILK IN CERTAIN CONDITIONS OF INFANCY*

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The feeding of whole milk which has been acted upon by lactic acid bacilli has been used by medical men in various conditions for a considerable period. In the last few years it has been used rather extensively by some in the treatment of certain feeding conditions of infancy. Probably one of the most enthusiastic of its advocates is Marriott of St. Louis. While working in the St. Louis Children's Hospital I had occasion to see the effects of its administration in a considerable variety of conditions and was impressed with its good results in many cases. During the last six months, while associated in the practice of pediatrics with Dr. O. W. Rowe in Du-

¹ *Jour. Am. Dis. Child.*, Oct., 1920.

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luth, I have used it in a series of cases both in the hospital and the home with a large degree of success, these cases forming the basis of this paper.

The most important action that the lactic acid bacillus brings about when added to milk, is to increase the acidity of the milk, which in turn aids digestion. This is explained by Marriott¹ as follows:

"Cow's milk differs from human milk in that it has a higher 'buffer' value. By 'buffer value' is meant the capacity to unite with relatively large amounts of acid or alkali without a great change in chemical reaction. If the same amount of hydrochloric acid is added to equal volumes of human milk and of cow's milk, it is found that the acidity of human milk expressed in terms of hydrogen ion concentration is far greater.

"When milk enters the stomach of a normal infant, gastric juice is secreted in such an amount that the stomach contents ultimately reach a certain degree of acidity; this degree is the optimum concentration of acid for rennin action and is sufficient to markedly inhibit bacterial growth. The presence of acid on the gastric side of the pylorus initiates a reflex which allows for passage of the food into the duodenum. Here the acid acts on some substance in the mucous membrane, which results in the production of the hormone, secretin, a substance capable of stimulating pancreatic and biliary secretion. Such is the normal course of events when the infant is fed on breast milk.

"Suppose, however, that the infant is fed cow's milk instead of breast milk. If the same amount of gastric juice is secreted it is entirely insufficient to render the stomach contents acid to anywhere near the same optimum degree; in fact, at least three times as much hydrochloric acid is required as in the case with human milk. We must therefore assume that the stomach secretes three times as much acid or else that the optimum acidity is not reached. To secrete this amount is probably beyond the functional capacity of certain infants; yet, if this amount is not secreted, bacterial inhibition and rennin action in the stomach occurs to only a slight degree. Without the passage of a sufficiently acid chyme into the duodenum, secretin formation and the hormone stimulation of the pancreatic and biliary secretion would necessarily be greatly diminished.

"In the light of these conditions is it any wonder that certain infants fail to thrive on cow's milk that

has been insufficiently diluted? It is interesting to note that those foods which have been found to be the best tolerated by malnourished infants are those which have a low 'buffer' value or in which the buffer is already partly neutralized by acid. Breast milk, well diluted cow's milk with added carbohydrate, lactic acid milk, and protein milk are examples."

In addition to the above action, the lactic acid milk is of value in that the bacilli outgrow and thus do away with a considerable number of other organisms, pathogenic to normal digestion, found in ordinary cow's milk. It cannot be said, however, to outgrow other bacteria in the intestinal canal or to completely change the flora there. The presence of the bacilli alters the milk only in the increased amount of acid present (about 0.5%) without in any way changing its food value.

This type of milk is usually prescribed much as an ordinary whole milk formula would be, using milk, water or cereal water, and sugar. The sugar which I have used has been given in the form of Karo syrup. This is used because of its high percentage of dextrin (dextrin 55%, maltose 30%, glucose 15%), the dextrin not being readily fermented and thus only mildly laxative. It can, in my experience, often be safely added in amounts considerably over the customary total seven per cent carbohydrates, and makes a cheap, easily obtainable sugar. The syrup is usually first diluted with an equal amount of water to facilitate its easier mixture into the formula. The cereal water used has been either oatmeal or barley water.

Stock cultures or tablets of bacillus *Bulgaricus*, obtainable at most druggists', are the source of our bacilli. They must, however, be fresh; the various companies usually date their period of usefulness on the bottle. I have been using the liquid suspension most of the time, though the tablets are reputed to be equally good.

Preparation of the whole lactic milk formula is a comparatively simple procedure, though entailing a little more work than the preparation of an ordinary milk mixture. Mothers, on the whole, complain little of it. The directions for home preparation are much as follows:

To the designated amount of whole milk in the formula prescribed, previously boiled and cooled to a temperature of 100°, is added one teaspoonful of liquid suspension of Bulgarian bacillus; the whole is then mixed well. This is set aside for

from twelve to twenty-four hours, an equable temperature of 100° being maintained. The limits of safety are 90°-120°. This degree of heat is kept by mothers in various ways, chief among which are setting behind the furnace or stove, wrapping in blankets and hot water bottles, or the use of a vacuum bottle. At the end of this period the soured milk is stirred up with a beater and forced through a strainer several times. The sugar, in the form of 50 per cent Karo syrup, is mixed with the diluent; this in turn is added to the milk, and the whole well mixed, divided into the specified number of bottles, stoppered, and put on ice till feeding time. The individual bottles are warmed to 100° before feeding, care being taken not to overheat, as coagulation may take place. It should be well shaken before and during the feeding. The hole in the nipple may have to be enlarged. We have encountered little difficulty in having mothers prepare this food, provided they are given explicit written instructions.

Children fed on a correctly prescribed formula, prepared as above, usually do well. It, like other feedings, is, however, far from being a cure-all and has, of course, its limitations. The infant usually rapidly acquires a taste for the new food and, after the first few days, likes it very well. He does not tire of it readily, and can be fed on it for an indefinite length of time. I have fed two children such a food for six months and several for four months, who have developed into exceptionally strong, hardy, happy babies. Of course, the ordinary additions to the diet must be made at the proper ages, namely: fruit juice, cereals, and vegetables. Under these circumstances, rickets, in my experience, occurs with no more frequency than on ordinary whole milk dilutions. We have several times been struck by the noticeably firm feel of these infants. The stools usually number one to four daily, are brownish grey or yellowish, have a consistency of thick salve, with a sour, not unpleasant odor; in fact, they are typical soap stools.

My series includes about twenty cases, both in and outside of the hospital. They have all been, in some degree, feeding disorders. Normal babies do well on it. The conditions in which it was used are as follows:

1. Athrepsia (atrophy, marasmus)..... 8 cases
2. Athrepsia associated with and due to pylorospasm 2 cases
3. Intestinal indigestion where other feedings were not well handled..... 1 case

4. Prematures or new-borns where breast milk was not available 5 cases
5. Recovery from debilitating infectious disease such as ileo-colitis..... 2 cases
6. Miscellaneous cases 4 cases

I have found it very valuable in athreptic babies because of the higher percentages of whole milk in a formula that can be given at any age. I have at times been able to give over 200 calories per kilo of body weight because of this factor. Most of my cases came under this class, and all responded favorably when their individual caloric requirements were determined. They gained satisfactorily, and the general improvement was marked. Formulas begun in the hospital were practically always continued when the child was taken home (frequently out of town) with continuation of the improvement, as the records will show. The following is a fairly characteristic case:

Case 1: S. C. No. 26022. In hospital 33 days. Two and one-half months old on entrance. Weight 4110 gm. Athreptic. Offered first a whole milk modification; gained only 100 gm. in 11 days. Changed to whole lactic milk formula; gained 440 gms. in 22 days. Sent home. Family conditions rather poor, but continued to do well. The weight at six and one-half months being 7600 gms.—a gain of 2060 gms. in two months, and the baby in excellent condition. Continued on the whole lactic milk mixture at home. Progress continued satisfactorily.

In athrepsia due to pylorospasm the whole lactic milk was mixed with varying amounts of thick barley gruel (another modification of the Sauer thick cereal feeding). The barley paste was first prepared and then added to the whole lactic milk, after its preparation. Such a formula might perhaps be:

Whole lactic milk	540.
Water	360.
Karo syrup, 50 per cent.....	60.
Barley flour	125.

Five feedings daily of 180 gms. each.

The following is such a case:

Case 2: V. T. No. 25652. In hospital for 34 days. Four months old on entrance. Weight 3770 gm. Athreptic. Marked stomach peristalsis and vomiting. Gained 950 gm. in 34 days in spite of numerous acute and chronic ailments. Not seen after discharge but heard from—gained 2310 gms. in two months, and did well on mixture. Later changed to whole milk formula and thick cereal gruel reduced.

Three cases of prematurity were offered this food. One of these children was fed it for seven months; its history follows:

Case 3: M. S. Weight on entrance 2150 gms. Gained for a time on a whole milk mixture; then held weight for 12 days. Fed whole lactic milk mixture for 7 months. Gained 3790 gms. in spite of an attack of erysipelas of

face, back and arms, lasting two weeks, and three periods of nasal infections with fever. A good firm baby the final result.

One case in which ordinary feeding was inductive to colic, gas, frequent stools, yielded good results:

Case 4: E. L. No. 22538. In hospital four days. Had previously been fed breast milk and complement of whole milk mixture. Result—gas, colic and distention. Gained 330 gms. in four days on breast and whole lactic milk complement, with relief of symptoms. Kept on this for two months; gained five and one-half pounds in this time. General condition excellent. Later changed to whole milk mixture, and did well.

It was fed in two cases during debilitating diseases such as follows:

Case 5: C. L. No. 26041. In hospital twice; diagnosis enteritis, bronchitis, perirectal abscess, rickets. Fed protein milk for a short time, then whole lactic milk mixture. Lost weight steadily during a febrile period due to the formation of a perirectal abscess. Stool always remained good. On opening of abscess gained 400 gms. within 6 days. Sent home. Had an upset, due to poor home conditions and ignorance. Returned to hospital five days later, put on same food, gained 270 gms. within 4 days. Discharged. Not heard from later.

In view of the uniformly good results obtained with this type of feeding, I feel that there is a considerable field in which it may be successfully used and in which it will give results superior to any other artificial food. Its greatest value, to my mind, can be realized in the treatment of athrepsia and its associated conditions.

A RESUME OF PARTIAL RECTAL PROLAPSE WITH A SUGGESTION AS TO TREATMENT*

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It is with some hesitation that I present this paper dealing with partial rectal prolapse, knowing as I do that the method which is to be described will probably not be acceptable to many physicians. However, for the past five years the method has been tried and found satisfactory in my hands, so I present it for what it is worth. The results have been excellent and sepsis, infection or other disagreeable complications have been noticeable by their absence.

The type of prolapse referred to in this paper is that in which only the mucous membrane is involved and where the muscular coat remains in its accustomed position. I always think of the rec-

tum as similar to a silk lined kid glove, the leather portion of the glove being the muscular coat and the silk lining the mucous membrane. The connection between these two coats is not very secure, they being held together by the blood vessels and nerves which pierce them and a small amount of connective tissue. Nature, however, by placing the rectum somewhat upon a slant and by projecting Houston's valves into its lumen has made it much more difficult for play to develop between the two coats than were the rectum a straight cylinder lying perpendicularly in the body. However, despite nature's forethought there is considerable room for movement between the two coats and indeed a certain amount is necessary.

If, for any of the well known reasons such as diarrhea, constipation, hemorrhoids, etc., the strain upon the mucous membrane becomes great, it begins to slip down a little with each strain or defecation. Each time it slips the play between the two coats becomes a little greater and unless it be promptly checked a noticeable prolapse soon results. This protrusion may vary from a slight fold which appears during the act of defecation and promptly returns as soon as the act is completed, to a protrusion of two or three inches which must be replaced manually, or, in extreme cases, where the sphincters are thinned and exhausted the protrusion may be constant. Partial prolapse is the most common type seen in infants and children. As many of these cases may be relieved by proper medical and dietary treatment, they are cared for by the pediatricians and hence do not present themselves to the proctologist. In adults, however, medical treatment is usually of no avail and it is necessary to take more energetic measures.

In carefully going over the literature on this subject it would appear that all the operations described utilize one of three fundamental principles:

1. The narrowing of the anal outlet, as the passing of a silver wire around the anus.
2. The resection of the protruding mucous membrane.
3. The fixation of the mucous to the muscular coat. All of these methods have produced cures, at least in the hands of their exponents, but they are not of equal value.

The first method or the narrowing of the anal outlet I do not believe fulfills either the proper surgical or anatomical principles and there is little excuse for its use. All that is accomplished by

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this procedure is to stuff the prolapsed mucous membrane back into the rectum and then by narrowing the opening to try to prevent it from prolapsing again. In children, whose tissues are elastic, this much help may in time enable the mucous and muscular coats to assume their normal relations. Indeed, most of the permanent cures recorded by this method are in children where careful dietary and medical treatment will often produce a cure without operative procedure. In older persons, whose growth is complete and whose tissues are more rigid, less elastic and have less reparative power, the narrowing simply holds a bunch of redundant mucous membrane out of sight in the lower part of the rectum and so prevents proper bowel movements. If for any reason the anal orifice becomes a little more patent, the mucous membrane is there, ready to prolapse again. The only place where it would seem that this procedure would be of service is where there is a marked relaxation of the sphincters. Here a narrowing of the outlet may be advisable as an adjunct to other operative procedures, but in no sense a cure in itself.

The second method or the resection of the prolapsed mucous membrane is not a proper method to employ as a curative measure. If a cuff be removed the mucous membrane above is still loose and will soon slide down, causing a recurrence. A number of fancy flap operations have been devised as modifications of the simple cuff operations and, while they may be somewhat better, the principle is wrong. Some of these operations do produce cures but in my opinion their success lies not in the fact that the protruding mucous membrane has been removed but rather that the operation has produced sufficient adhesions to prevent further prolapse. If no adhesions are produced, later recurrence is almost certain.

The third principle is that of anchoring or fixation of the mucous to the muscular coat and is the only method where there is an attempt to restore the parts to their normal relations and hence the only one which is anatomically correct. Since the prolapsus results from insufficient attachment between the mucous and muscular coats, any method which will bind them securely together will give an anatomical as well as symptomatic cure. It is true that in a few cases in old people where there is a constant protrusion of a large amount of mucous membrane through a relaxed and gaping sphincter, a resection of a portion of this mass and

a narrowing of the anus may assist in producing a cure. Even in these cases it is surprising how often the anus will contract down and the sphincter regain its tone if the mucous membrane be returned inside the rectum, fixation produced by the method to be described, and the patient be kept in bed for a few days.

The most common methods employed for producing the required adhesions is that of linear cauterization. This is usually done by the use of a caustic or the actual cautery, from four to six longitudinal burns being made over the prolapsed area. These burns must be deep enough so that the tissue underlying the mucous membrane is involved, otherwise sufficient scar formation will not occur. It is usually advised that the lines of cauterization be carried down through the anal canal. This method requires either a general or extensive local anesthesia, as pain is usually marked. A slough always occurs if the attempt is to be successful.

By the use of submucous injections of quinine urea hydrochloride this method can be greatly simplified, pain dispensed with and practically all cases treated as ambulatory patients. Further than this, I feel that the drug is much more under the control of the physician than where nitric acid or the actual cautery is used. The method as the one just described is based on the principle of the fixation of the mucous to the muscular coat and is very simply and easily executed.

The patient is placed in a Sims or squatting position and then by straining and manipulation the exact extent of the prolapse is determined. The patient is now placed in the knee chest position for treatment. An anoscope is introduced and with the inrush of air the mucous membrane flattens out over the muscular coat in approximately its normal relations, leaving practically no folds. Four sites are now selected equidistant around the circumference of the bowel and carefully cleansed with peroxide, iodine and alcohol. The distance of these sites from the anus depends upon the extent of the prolapsus. In the average case a point a little above the hemorrhoidal area is taken. At each of these sites from five to ten minims of 5 per cent quinine urea hydrochloride are injected into the space between the mucous and muscular coats. The patient is then allowed to lie down for a few minutes and is then ready to leave the office. It is necessary that the bowels be kept soft and straining prevented, and for this, liquid petrolatum is given in sufficient quantity. The treatment is

repeated every fifth to seventh day until a cure is effected. The action produced by quinine urea hydrochloride of this strength is the same as anywhere else in the body, namely the calling forth of a fibrino-plastic exudate which is later partially absorbed and partially replaced by dense scar tissue which binds the two coats together.

As has been stated there are a few cases where there is a large amount of mucous membrane constantly prolapsed and the sphincters thinned and relaxed where a preliminary resection may be advisable. It is surprising, though, how many cases, in which upon first examination this would seem the procedure of choice, will respond to the simpler treatment if, after the first injection, the patient be kept in bed for a few days with the buttocks strapped.

There may be some who will question whether this method will actually produce a cure. I can only say that it has done so in my hands and I believe that it will do so in the hands of anyone who will give it a thorough trial. In principle the treatment is correct, namely, to restore the mucous lining of the bowel to its proper anatomical relation and fix it in that position. Any procedure which does not give an anatomical as well as symptomatic cure cannot be accepted as ideal. Though it is granted that this method be more tedious I believe that the technique described in this paper will give a larger percentage of good results than any other one method and with less pain and greater satisfaction to the patient.

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DISCUSSION ON THE PAPERS OF DRS. W. A. FANSLER AND L. A. BUIE

Dr. ROOD TAYLOR, Minneapolis: As a pediatricist I have had a very small experience in rectal polypi. I do not think, however, that they occur with any great frequency in childhood. I cannot recall, during my time at Rochester at the Mayo Clinic, that I ever saw one, and we have had only one case in the Abbott Hospital in the last three years. Partial prolapse of the rectum does occur very frequently. One reason possibly for its frequent occurrence in childhood is that the rectum in children lies more nearly vertical than in later life. However, partial prolapse of the rectum is nearly always secondary to and most frequently is the result of diarrhea; second, to constipation, and third, to general muscular weakness and relaxation, so that its treatment is the treatment of the cause of the constipation, the cause of the diarrhea, or the general bodily weakness. I have seen only one case which required surgical attention.

Dr. J. C. MASSON, Rochester: I was much interested in both of these papers, but I have a feeling that this is a subject not very well understood by the men engaged in general practice and in general surgery, and that a great many cases are inadequately or incorrectly treated.

A great many of the cases of prolapse of the rectum are incomplete, and proper handling in the early stages would prevent the more serious condition which often entails a serious operation.

I have had little experience with such cases in children in recent years, and I am glad to hear that this treatment promises so much. Most of the cases of partial prolapse in children can be cured by regulation of the bowels. I have observed a few cases associated with hemorrhoids, and the treatment has been along the line suggested in the first paper, by cauterization. In treating ordinary prolapse of the rectum, which is associated with hemorrhoids, we have resorted to free linear cauterization, removing the pile mass and a certain amount of the mucous membrane by cauterizing well up into the prolapsed area. The rectal mucous membrane retracts to its normal position and becomes adhered in that position. Thorough dilatation of the rectum and the avoidance of movements of the bowel for five days is important.

Dr. Buie is to be congratulated on his instrument. No doubt there is no class of cases which we regret to see more than carcinoma of the rectum. The operation for this is very serious and patients are slow to consent to it. In many cases it means an artificial anus. It is probable that in a large number of cases the carcinoma of the rectum started from polyps which were originally benign. If it is a single polyp, with a small pedicle, removal such as Dr. Buie suggests means a minor operation and a safe one for the patient. With the older treatment it meant laparotomy, opening the sigmoid, and exposing the peritoneal cavity to possible infection; and the operation is almost as danger-

ous as resection. Of course, polyps with sessile bases will probably have to be treated in much the same manner for some time, but we hope with the advent of this instrument others will be stimulated to produce an instrument so that tumors with larger bases can be handled.

Dr. Buie did not refer to the great field that it opens to the surgeon in the cure of cases of multiple polyposis involving not only the rectum but the sigmoid. If, for example, multiple small polyps in the rectum, or close to the rectosigmoidal junction, can be treated individually, resection of the diseased part can be carried out and the lumen of the bowel be established. At present the treatment in such cases is the same as that for carcinoma, which means destroying the lumen of the bowel and leaving the patient with an artificial anus.

DR. W. A. FANSLER, Minneapolis (closing the discussion on his part): I heartily endorse what Dr. Masson has said about Dr. Buie's instrument. It is a really valuable contribution to the equipment of the proctocologist. It is an instrument with which we are going to save a great many lives by avoiding serious operations when patients can be cared for by the simpler method he has outlined.

As to my own paper, cauterization is certainly one of the operations of choice, and where there is some complicating condition, such as hemorrhoids, it should be done. I am simply offering a less radical procedure in cases that are uncomplicated.

DR. L. A. BUIE, Rochester (closing): Cancer of the rectum is, perhaps, the result of polyposis in many instances. There is a tendency, almost constant, for adenomatous polyps to degenerate. This is so true that I think these tumors should be considered potentially malignant in all instances and should be taken out, if possible. Dr. Masson has suggested the use of the clamp in removing multiple polypi from the bowel through the proctoscope. It would seem that there might be a possibility for the use of this method along the lines used in the treatment of ulcerative colitis.

In this latter disease, we treat the lower sigmoid and rectum hoping to heal it with the idea of excluding the colon and doing an ileosigmoidostomy. With the same thought, it might be possible to remove polypi from the lower sigmoid and rectum in cases of extensive multiple polyposis and exclude the colon, or do a colectomy and bring the ileum down to the sigmoid or rectum.

I think Dr. Fansler's idea concerning the treatment of prolapse should be given a trial. Quinine and urea has been used as an injection in the treatment of hemorrhoids ever since Dr. Terrell, of Richmond, Virginia, wrote concerning his experience with it, in 1914. Its value is based on the fact that the solution causes fibrosis around the veins. A great deal has been written which bespeaks the value of this method. This is sufficient evidence of the logic of Dr. Fansler's thought in using these injections in trying to establish a fibrosis beneath the rectal mucous membrane.

When we see the unsatisfactory results which so frequently have come from the numerous other treatments of prolapse of the rectum, very often by drastic surgical procedures, it is certain that so simple a procedure as Dr. Fansler has described should be given a fair trial.

THE PUERPERIUM FROM THE STANDPOINT OF THE NEUROPSYCHIATRIST*

C. EUGENE RIGGS, M.D.

St. Paul, Minn.

"A woman is a woman," says Virchow, "because of her ovaries." Berman¹ tells us that at birth there are from 30,000 to 200,000 ova in the safe deposit vaults of the ovary and of these only about 400 mature between the ages of fifteen and forty-five. Puberty will be calm or stormy according to the manner in which the ductless glands react to the eruption of the ovary. Modern feminism is not only withdrawing more and more of the best women from marriage and motherhood but it is developing masculinity; and the stress and strain of the new social order inhibits maternal instinct, causes menstrual disorders and makes for sterility.

The change occurring at puberty and adolescence in the evolution of the organism and those incident to involution at the climacteric, while of great and far reaching significance, are entirely overshadowed by those taking place in pregnancy. It is the time of somatic testing. "Pregnancy is the time among the internal secretions of a great uprooting and stirring of fundamental and cataclysmic changes in the most intimate chemistry of the cells" (Berman). The profound tides of the hormones centering around the new creative being of the womb transfigures the face and constitution of the child-bearing woman. This remarkable change associated with maternity, Berman aptly illustrates by a quotation from *Main Street*—"I do not look lovely, Mrs. Bogar," says the heroine, "my complexion is rotten, my hair is coming out, and I look like a potato bag, and I think my arches are falling—and the whole business is a confounded nuisance of a biological process." By some the placenta is regarded as a ductless gland which influences the internal secretions of both mother and child.

Maternity is beset with countless fears; dominant among these is the dread with which the life instinct views the approaching ordeal and the natural shrinking from the inevitable pain incident to confinement. Forty years ago, Dr. A. J. Stone, always a pioneer, used chloroform to relieve needless suffering; immediately there was directed against him

*Read before the Symposium of Obstetrical Problems. Clinic Week, St. Paul, Minn., Jan. 11th, 1922.

¹The Glands Regulating Personality, Lewis Berman, M. D.

a cruel and absurd propaganda that he was guilty of a wicked and irreligious act, for did not the primal curse say "that in pain thou shalt bring forth thy children"? The following case of Buzzard illustrates the disturbing influence of fear. An immaculate spinster of 47 years had for months been agonized by fear that she was about to give birth to a child; inquiry revealed that she was not even aware of the steps necessary for such a fear to be realized.

The affections incident to the puerperium from the standpoint of neuropsychiatry are: localized traumatic neuritis due to the pressure of the head, obstetrical palsies, the cerebral palsies of childhood, neurasthenia, hysteria, Korsakoff's syndrome and the psychoses. Obstetrical palsies are due to manipulations during labor. A loosely hanging arm or an atrophied shoulder in a child or infant indicates a birth paralysis; it may occur unilaterally or bilaterally, and is not of uncommon occurrence. It is likely to improve as the child grows older. Cerebral palsy due to subdural hemorrhage means usually paralysis, spasticity, idiocy and lifelong helplessness; if the symptoms of shock, convulsions and paralysis are recognized, surgery may achieve one of its most brilliant successes. Talleyrand once remarked that speech was given to man in order to disguise his thoughts; while this may be true of diplomacy, it is equally so of any discussion of neurasthenia and hysteria. Beard's conception of the former and Charcot's of the latter, not many years ago generally accepted, are now archaic. Both these diseases are a symptom-complex, not a distinct clinical and pathological entity. Parasitic, like Spanish moss, they can grow on any tree. They are the neurotic fringe of an unstable nervous system. In neurasthenia, basically we find a nervous constitutional inferiority, the neurasthenic syndrome being caused by exhaustion, faulty metabolism, endocrine unbalance, psychic stress, focal and acute infections. In pregnancy, Dr. Paramore believes that neurasthenia depends to a great extent on a depressed intra-abdominal pressure due to emptying the uterus. If this theory is true, says Buzzard, every woman bearing a child should become neurasthenic and in the case of twins she should become insane. Hysteria is a disease of the subconscious. Psychopathology has relegated the classical forms of Charcot, spinal concussion and traumatic neuroses to the medical scrap heap. The Korsakoff syndrome and its asso-

ciated neuritis may occur during pregnancy. It is caused by the toxemia arising from many diverse pathological states. As to the nature and toxicity of the offending toxins we are absolutely ignorant.

If ocular manifestations occur in the first six months of pregnancy, associated with violent headaches, gestation should be immediately terminated. Death may result from neuritis. The prognosis depends on the severity of the process and the conditions under which the disease originates. Recovery may be a matter of months—sometimes years. Patients who have suffered from pernicious vomiting and other toxic symptoms should be cautioned to avoid future pregnancies.

You will recall the story of the man who wrote a book on "The Natural History of Ireland," one chapter of which treated of "The Snakes" and consisted of three words—"There are none"; following this writer, I can remark, *there are no insanities peculiar to the puerperium*; they differ in no way from those occurring in the non-pregnant state and like them depend on a neurodegenerative taint. "The puerperal psychoses," writes Dr. Adolph Myer, "are very much the same as outside of the puerperium. As in surgical problems, occasionally cases respond with more or less unaccountable delirium. The conditions with which we deal are very largely a climax of accumulated tension, and it is very remarkable how often one finds suspicion of infidelity, reactions to inferiority feelings, probably due to a loss of attractiveness and states of perplexity. During lactation schizophrenic symptoms may arise based on the constitutional make-up, dread of renewed pregnancies, etc. Langdon well says that "it is the patient, not the parturition that determines the type of the mental disorder." Pregnant women do become insane—one in every four hundred; any form of mental disease can occur at this time. Thackeray's wife developed dementia precox after her third confinement. Dementia in pregnancy is rare; its occurrence signifies that an unrecognized or a latent precox patient has become pregnant or that a latent paresis has become active as a result of the pregnancy. Pregnancy in neurotic women after the thirty-second year, or long intervals between children (Craig) or late pregnancies (Dercum) are liable to develop psychoses. In some women the birth of a male child is associated with a psychosis while that of a female is attended with no ill effects. (Craig.) Disturbance of consciousness at the beginning of labor indicates

grave sepsis or eclampsia (Klix). Coincident with conception some women manifest a change of character or disposition; they become depressed, irritable and suffer from insomnia; these symptoms being invariably present the patient makes her own diagnosis. A prior psychosis does not necessarily mean its recurrence during the parturient period. Dercum states that one of his manic-depressive cases is nearer normal during pregnancy than at any other time. When predisposition obtains, the insanity usually occurs early, less frequently at full time and during lactation (Paton). Insanity before quickening frequently recovers at that time; after this it lasts through and usually long after delivery. Neither induction of premature labor nor normal delivery relieves the mental symptoms. Women who have suffered from a psychosis, when they again become pregnant, usually become terrified and consult their physician in great trepidation. A few words of encouragement dispell their fears. In my personal cases there has not been a recurrence or any ill effects.

The descriptions of the older writers of the manic-confusional state designated as puerperal mania is one of the most dramatic characterizations of all medicine. Slight emphasis was placed on infection, on neurodegenerative taint none; the malignant trinity of causes were hemorrhage, exhaustion and mental strain; especially stressed was the shame and worry of illegitimacy; graphically they pictured the patient, conscience-stricken and terrified in her wild delirium, slowly counting the hours of her assignation.

Mental disorders occurring during the puerperium are usually divided into three classes:

1. The insanity of pregnancy (11.33 per cent)—that is any insanity manifesting itself before confinement.

2. Manic-confusional insanity (46.4 per cent)—improperly called puerperal insanity. Mental disturbance developing within six weeks after labor falls under this head; broadly speaking, if it occurs within two weeks after parturition it is a mania; later a melancholia. Fürstner's acute hallucinatory insanity of parturition I believe should be included here. One should speak of the *insanities* of this period, for in addition there may occur acute mania, dementia precox or paresis differing in no way from the same insanities in the non-pregnant state.

3. Lactational insanity (42.18 per cent, Hoche). This arbitrarily includes any mental disorder appearing six weeks or more after delivery.

The insanity of pregnancy and lactation is usually a melancholia—the depressive phase of manic-depressive insanity. Excitement associated with mental confusion and hallucinations constitutes the manic-confusional type.

Manic-confusional insanity heads the list, followed by lactational and the insanity of pregnancy. The latter is rare and not invariably a depression. It may be a dementia precox. This sometimes occurs in interrupted stages, each corresponding to a period of pregnancy (Defursac). Melancholia is characterized by depression, self-accusation, constantly worrying because of personal wrong-doing, not that of some one else as in precox, sluggish mental reflexes and suicidal impulses. In lactational insanity the breasts secrete a hormone, which tends to inhibit the ovary and thus prevents an imposition of pregnancy during lactation, an unfortunate happening for mother, infant or embryo (Berman). Dementia, either of precox or paresis, is a parturient coincidence more or less camouflaged by the condition under which it arises. The unsystematized, fragmentary and unrelated delusions, the hallucinations, the delirium and the clinical picture of manic-confusional insanity suggest a toxic cause. It is a delirium and not a mania; often this is of a low muttering type; there may be a dry tongue and sordes form on lips and teeth. Paton calls attention to the fact that fever and local septic processes are not always parallel phenomena with psychic disturbances. The onset is acute: the patient becomes restless, sleeps badly, is suspicious, develops an aversion to the child; she may commit infanticide; she is at first talkative, then noisy, shouting and singing, develops hallucinations, refuses all nourishment, is destructive of clothing, mentally confused, incoherent and disoriented. Generally there is an elevation of temperature varying from 100 to 101 degrees; the lochia becomes offensive, scanty, then ceases; the milk dries up. In only one other disease—paresis—is the excitement equally acute. A wild maniacal outburst may occur at the period of crowning during which the mother may kill the child. The manic-confusional type is by no means limited to the puerperium. Exhaustion, alcohol, kidney disease, sepsis, etc., are common causes. The manic-depressive form occurring in the puerperium is liable to recur. Clouston observed in one patient five recurrences with an ultimate recovery; each attack accentuates the neurodegenerative taint and militates against recovery. Dr. Earl Bond reports a

striking case where a true manic state developed after a first baby with recovery in six months, after a second baby with recovery in six months, and after an operation for amputation of the uterine cervix, also with recovery in eight months.

Persistent insomnia during any period of pregnancy should be regarded with concern, especially in a neurotic primipara; either sleep must be secured or instrumental delivery resorted to (Craig). Insane patients do not react to pain as a normal person does and the nurse must be on the watch for retention of urine, varicose veins and edema. An acutely insane woman may not complain of labor pains.

The manic-depressive type occurring during the puerperium generally recovers, with much the same symptoms, says Bond; one case may recover promptly and the other subside into a dementia. In the manic-confusional form, if the patient does not die from exhaustion, recoveries occur in 30 per

cent of the cases in from three months to a year; if infection does not take place and mental stress is negligible there need be no recurrence. Insanity of lactation is usually of long duration. Every melancholia is a potential suicide and according to Langdon every puerperal woman a potential infanticide. The removal of the infant is imperative until after recovery. Only the mildest forms can be cared for in the home; hospital environment is indispensable. Morphia and chloral of a former day has been replaced by rest, elimination, isolation and over-feeding. In these patients food is a surpassingly good hypnotic.

Note: The quotations from Dr. Adolph Meyer, The Johns Hopkins Hospital, and Dr. Earl D. Bond, Department for Mental and Nervous Diseases, Pennsylvania Hospital, were personal communications. I am also indebted to Dr. F. W. Langdon's address before the Obstetrical Society of Cincinnati, for valuable suggestions.

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No. 6

EDITORIAL

State Medical Meeting—Minneapolis

Attention is called to the change in date set for the annual meeting of the Minnesota State Medical Association to be held in Minneapolis in the fall. The Council of the Association has changed the date to Thursday, Friday and Saturday, October 12, 13 and 14, 1922, the scientific program to occupy Friday and Saturday. This change was made to avoid conflicting with the annual meeting of the Mississippi Valley Medical Association, which is scheduled to meet at Rochester, Minnesota, this year, October 9-12 inclusive. This change in date will enable visiting physicians at Rochester to attend the State meeting at Minneapolis, the two days following.

Early notification of the program committee regarding the presentation of papers at the State meeting is important and an effort is being made to have a representative program from the entire state. The program committee feels that the annual meeting of the State Association offers the opportunity for Associate members primarily to present medical subjects before their confreres and a long list of outside speakers is not contemplated.

The program committee for 1922 is as follows:

Medical Section

Dr. J. G. Cross, chairman, Donaldson Bldg., Minneapolis.

Dr. David M. Berkman, Secretary, Mayo Clinic, Rochester.

Surgical Section

Dr. E. K. Green, chairman, 808 Physicians and Surgeons Bldg., Minneapolis.

Dr. E. M. Jones, Secretary, 1014 Lowry Bldg., St. Paul.

Goiter Prevention

In the early days such as those described by Wells in the opening chapters of his History of the World, iodine was undoubtedly well distributed throughout the earth.

Through the action of natural forces, the readily soluble sodium iodide, which is the salt of iodine commonly found, has been washed down into the sea which now seems to be its chief source. Through action of air and spray from the sea, nearly by vegetation contains iodine and animal life near the sea coast obtains sufficient iodine for normal thyroid metabolism.

On the contrary, regions such as Switzerland, the Great Lakes basin and the Cascade Mountain region are practically devoid of iodine and are well known as goiter districts. Minnesota has its share. The water of mountain districts is entirely lacking in iodine. It is interesting to note the great increase of the incidence of goiter in Vienna after the late Austrian emperor Franz Joseph presented the city with a mountain water supply. Seattle, Portland and Tacoma are said to have shown a similar increase as a result of receiving their water supply from the Cascade mountains.

Up to fifty years ago commercial table salt was procured from the ocean and contained iodine salts. Now, thorough refining processes have resulted in the elimination of the iodine from salt of sea origin. Salt from inland sources, such as the Great Salt Lake contains no iodine. All these factors have resulted in eliminating iodine in large measure from human diet.

Animals and fish are subject to goiters as well as man—or shall we say woman. Land-locked salmon are known to develop goiters. Back in 1909, Marine and Lenhart prevented goiter in trout by the addition of iodine to the water in the ratio of one to a million parts.

The work of American investigators—Marine and his co-workers in particular—has called attention to the value of the addition of iodine to the diet and they have proven the practical application of iodine administration for the prevention and cure of goiter by the addition of almost homeopathic doses.

In 1917 Marine and Kimball* began extensive experiments on the school children of Akron, Ohio, and in brief the result of two and a half years' observation showed that only five goiters developed in some 2,190 pupils who were given a grain of sodium iodide over a period of ten days twice a year, while 495 goiters developed in some 7,320 cases who were not given the iodine. Observation showed, too, that this administration of iodine reduced roughly five times as many goiters as occurred in control cases not given iodine.

Klinger of Zurich reported a similar experience. The goiter incidence was reduced in 760 children from 90 per cent to 28 per cent in fifteen months by the administration of 10 to 15 mg. of iodine weekly. He also reported that thyroid enlargement in both the fetus and pregnant mother can be prevented by the administration of two grams of sodium iodide during the first half of pregnancy.

We venture to predict that the time is close at hand when iodine will be given almost universally in this country, particularly in goiterous districts. School children in the grammar school grades need it most for the adolescent goiter so common in young girls is most apt to occur from puberty on. It is a simple matter to give minute amounts of the sodium salt in sweet chocolate or wafers.

Perhaps the simplest method of iodine administration is the addition of minute quantities of sodium iodide (1 mg. NaI to 15 grams NaCl.) to the table salt and without doubt a special brand of iodized table salt will be forthcoming on the market.

A note of warning should be sounded. Although no case of exophthalmic goiter developed in either Marine or Klinger's series, iodine is absolutely contraindicated in the exophthalmic variety of goiter. It is well established that care should be taken in the administration of iodine to adults with goiters that are suspected of being hyperactive. There is likely to be a rush for iodized salt or iodine in some form by individuals afflicted

with goiter and the profession will have to take care in advocating the use of iodine in the prevention of goiter to lay proper emphasis on its contraindication in cases of overactive goiters.

Intra-Rectal Medication

It is safe to say that the average physician consigns to the wastepaper basket the great majority of circular letters received daily from the various commercial houses which call to his attention the wonderful therapeutic value of new remedies with hyphenated trade names, coined in many instances to favor greater sales.

One received in the morning mail did not receive the usual fate at once because the apparent plausibility of its contention only made it the more insidious and dangerous. The letter head was quite impressive and indicated the international character of the firm and its activities. A quotation rightly calls the physician's attention to the importance of correct and up to date treatment of syphilis, if he is to avoid losing prestige. He is then told that *the newest and safest treatment of syphilis is by the intra-rectal method*. One is reminded that quotations, if irrelevantly chosen, may lead to most absurd conclusions; for instance, "Then Judas * * went away and hanged himself." "Go thou and do likewise."

Our Council on Pharmacy and Chemistry has investigated the question of the rectal administration of arsphenamine and has concluded there is "a lack of evidence for the efficiency of this method of arsphenamine administration." We as practitioners are not going to abandon the well established efficient intravenous method for an easier and in all probability worthless method of medication with this particular remedy.

Intra-rectal medication has its place. There is no more satisfactory route for the administration of salicylates in acute rheumatic arthritis. The same applies to certain other drugs. The slower absorption prolongs the action of the drug and the poorer absorption necessitates roughly double the oral dose.

It is only necessary to call the attention of the profession to this insidious advertising and surely the opinion of the members of our Council on Pharmacy and Chemistry who are physicians should be accepted in preference to judgment so often warped by the influence of the almighty dollar.

*Marine, David and Kimball, O. P.: The Prevention of Simple Goitre in Man. A. M. A. Jour., Vol. 77, No. 14.

COMMUNICATIONS

Dr. Carl B. Drake,
Secretary, Minnesota State Medical Association,
1235 Lowry Bldg., St. Paul, Ramsey Co., Minn.
Dear Dr. Drake:

The State Board of Health, at its meeting, January 10, 1922, provided for State Advisory Board on Maternal and Infant Hygiene, consisting originally of seven members, now increased to nine, as follows:

1. Dr. L. D. Coffman, President, University of Minnesota.
2. Miss Caroline Crosby, Board of Control.
3. Mrs. J. R. Brandrup, Mankato.
4. Miss Marguerite Wells, President, League of Women Voters.
5. Mrs. John Priedeman, Minn. State Registered Nurses' Association.
6. Mrs. M. F. Ernst, Secretary, State Parent-Teachers' Association.
7. Dr. F. L. Adair, State Medical Society.
8. Dr. N. O. Pearce, Northwestern Pediatric Society.
9. Dr. Wm. F. Wild, Executive Secretary, Minn. Public Health Association.

The duties of this Board are:

1. To suggest rules and regulations for adoption by State Boards of Health as authorized under Chapter 392, Session Laws of 1921, to carry into effect the provisions of this Act.
2. To pass upon plans of County or District Boards on Maternal and Infant Hygiene.
3. To advise the State Board of Health what assistance be given to county or district boards whose plans are approved.
4. To secure co-operative action through the various agencies represented by the members of the board in carrying out the provisions of the Federal and State laws on maternal and infant hygiene and to promote the public health and child welfare program in Minnesota.

The Board also provided for county administrative boards with membership of five. It was found, upon checking the membership for the counties throughout the state as originally outlined, that in a few counties there would be only one or no woman member on the Board. At a meeting of the State Advisory Board, April 21, this matter was discussed thoroughly, and finally, by unanimous vote, it was recommended that the State Board of Health provide for a County Administrative Board of five members, at least two to be women, with three set members, as follows:

- (1) County health officer;
- (2) County commissioner (the one who is on the Child Welfare Board, if any, in county);
- (3) Physician to be selected by County or District Medical Society and appointed by the State Board of Health as the medical members of county sanatoria commissions are appointed.

* * * * *

The State Board of Health, and also the members of the Advisory Board, are firmly of the opinion that the success of the maternal and infant hygiene work will depend upon the attitude of the state, district and county societies, and of the individual physicians practicing medicine in Minnesota. It is the desire of the State Board of

Health to get in touch with all the medical organizations and with the individual physicians and satisfy them that the work will be conducted so that the best interests of the medical profession, as well as those of the general public, will be assured. Not only the plan for the work, but the details in carrying out the plan, will be explained fully to the physicians, and the greatest care will be used to keep them informed so that they will know that they are considered as the most important of all the various workers interested in maternal and infant hygiene.

Today I have received a letter from the Director of the Children's Bureau, Washington, in answer to one sent April 29 with the certification of the State Treasurer for the 5,000 gift from the Minnesota Public Health Association. It is necessary to revise these papers and to make up the budget including new items since certain questions raised in my letter, by authority of the Board, were answered favorably in a general way. Briefly, these questions related to the matching by federal funds of money used in State Board of Health work from special funds, as follows:

1. Ophthalmia prophylactic fund.
2. Diphtheria antitoxin fund.
3. Venereal disease fund, to the extent of 3 per cent, which represents the amount spent for congenital syphilis.
4. Division of Sanitation fund for clean milk campaigns outside Minneapolis, St. Paul, Duluth. The Division spends about \$4,700 a year in this work, and clean milk is needed chiefly for young children, having demonstrated influence on diarrheal diseases, as well as general development and nutrition in relation to tuberculosis, etc.
5. Preventable disease fund. In 1921 the morbidity reports show that 4 per cent of the total cases of notifiable diseases occurred among children under 5 years of age. In view of the fact that two very important diseases of this age group—whooping-cough and measles—are very incompletely reported, to say that 6 per cent of the total appropriation for the Division is used for the benefit of children under six, is conservative.

* * * * *

I hope to have all questions decided and staff employed so that the actual work may begin about June 1.

* * * * * Respectfully,

A. J. CHESLEY, M.D.,

Executive Officer,

State Board of Health.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

SOUTHERN MINNESOTA MEDICAL ASSOCIATION

The midsummer meeting of the Southern Minnesota Medical Association is scheduled for Monday and Tuesday, June 19 and 20, 1922, at Rochester, Minn. Headquarters will be at the Hotel Kahler.

Registration blanks for assignments to special demonstrations and symposiums are being sent out to the members and must be filled out and mailed not later than June 15th to Dr. Howard R. Hartman, chairman. A large attendance is assured and registration should be made early.

Physicians are earnestly requested to bring their wives

to this meeting as special entertainment will be provided for visiting ladies.

Special attention is called to the arrangement made, whereby railroad transportation may be secured for a fare and one-half providing a certificate or receipt showing the purchase of one-way ticket is secured and presented when purchasing return ticket. This special rate covers the territory including Illinois, Iowa, Minnesota, Nebraska, North Dakota, South Dakota, Wisconsin and from Julesburg, Colorado.

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Secretary-Treasurer		
Mr. Wm. Whitford	- - - - -	Chicago
Official Stenographer		

Dr. Aaron F. Schmitt, Secretary General.

705-707 Physicians & Surgeons Building, Minneapolis.

Committee of Arrangements for Rochester Meeting:

Dr. Howard R. Hartman, Chairman, Rochester, Minn.

Mr. Roy Watson, Secretary, Rochester, Minn.

Dr. Monte C. Pipet, Rochester, Minn.

Committee of Entertainment for Rochester Meeting:

Dr. David M. Berkman, Chairman, Rochester, Minn.

Dr. Paul A. O'Leary, Rochester, Minn.

Dr. Woltman Walters, Rochester, Minn.

Mr. H. A. Johnson, Rochester, Minn.

Dr. W. G. Workman, Tracy, Minn.

Dr. C. C. Allen, Austin, Minn.

Dr. F. R. Huxley, Faribault, Minn.

COMMITTEES

Program Committee:

Dr. H. W. Meyerding, Chairman, Rochester, Minn.

Dr. J. C. Staley, St. Paul, Minn.

Dr. B. P. Rosenberry, Winona, Minn.

Executive Committee:

Dr. A. W. Adson, Chairman, Rochester, Minn.

Dr. A. C. Strachauer, Minneapolis, Minn.

Dr. W. J. McCarthy, Madelia, Minn.

Committee on New Members:

Dr. W. C. Portmann, Chairman, Jackson, Minn.

Dr. F. A. Willius, Rochester, Minn.

Dr. J. T. Schlesselman, Mankato, Minn.

Committee on Necrology:

Dr. J. E. LeClerc, Chairman, Le Sueur, Minn.

Dr. G. B. Weiser, New Ulm, Minn.

Dr. C. J. Holman, Mankato, Minn.

Committee on Clinical Research:

Dr. H. Z. Giffin, Chairman, Rochester, Minn.

Dr. W. H. Valentine, Tracy, Minn.

Dr. S. M. White, Minneapolis, Minn.

Committee on Resolutions:

Dr. J. H. Adair, Chairman, Owatonna, Minn.

Dr. F. R. Huxley, Faribault, Minn.

Dr. C. C. Allen, Austin, Minn.

Committee on Nominations:

Dr. M. C. Piper, Chairman, Rochester, Minn.

Dr. George Stevens, Byron, Minn.

Dr. W. H. Rowe, St. James, Minn.

ENTERTAINMENT FOR VISITING LADIES

MONDAY FORENOON

At the Kahler

10:30 A. M.—Lecture, "The Application of Mental Hygiene to the Family"—Dr. T. Wheeler (Mrs. Wm. Finny), Sun Room, Kahler.

12:00 A. M.—A Picnic Luncheon, Mayo Park, under the auspices of Olmsted County Medical Society.

MONDAY AFTERNOON

2:00 P. M.—Auto Ride starting from The Kahler.

3:00 P. M.—Reception and Tea given by Mrs. C. H. Mayo at residence; Reception and Tea given by Mrs. W. J. Mayo at residence (immediately following auto ride). (Gentlemen are welcome.)

5:00 P. M.—Transportation will be furnished to bring the guests back to The Kahler.

6:30 P. M.—Semi-annual Banquet at High School. (Informal.)

TUESDAY FORENOON

10:30 A. M.—Lecture, "Combustion Products of Fuel and the Cancer Problem"—Dr. G. M. Luden, Sun Room, Kahler.

TUESDAY AFTERNOON

2 to 5 P. M.—The Visiting Ladies will be entertained by the Magazine Club at the Golf Course at Tea, Golf and Bridge.

The Golf Club has made arrangements so that the afternoon of Sunday, the 18th, the Golf House and Course will be at the disposal of the Southern Minnesota Medical Association. Matched plays or a tournament can be arranged if a sufficient number will avail themselves of the privilege.

The afternoon of Tuesday, the 20th, the Golf House and Course are given over to the visiting ladies and their hostesses. Such physicians as are not attending the meetings that afternoon are cordially invited to use the course.

MONDAY FORENOON

June 19th, 8 A. M.

Program of General Meeting

Methodist Church

Symposium of Thyroid Diseases

8:00—Dr. W. A. Plummer, Exophthalmic Goiter.

8:30—Dr. C. A. Hallberg, Thyroiditis.

8:45—Dr. F. A. Willius, The Heart in Hyperthyroidism.

9:00—Dr. W. M. Boothby, The Relationship of Basal Metabolic Rate to Hyperthyroidism.

9:30—Dr. H. S. Plummer, Diseases of the Thyroid.

11:00—Dr. Walter H. Valentine, Tracy, Minnesota, The Early Symptoms of Acute Poliomyelitis.

Symposium on Diseases of Urinary Tract in Children

10:00—Dr. S. Amberg, Enuresis.

10:30—Dr. H. F. Helmholtz, Pyelitis: a. Relation to respiratory tract infection; b. Treatment.

11:00—Dr. H. O. Foucar, Tumor of the Kidney.

MONDAY AND TUESDAY FORENOON

June 19 and 20, 1922—8 A. M.

Special Clinical, Surgical and Medical Demonstrations

BY	PLACE	NATURE	DURATION	ATTEN-
			HOURS	DANCE LIMITED TO
Surgical Staff	St. Mary's Hospital New Surgical Pavilion	Surgical Clinics	Four	20
Surgical Staff	Kahler (11th Floor)	Thyroid Surgery	Four	30
Surgical Staff	Colonial Hospital (5th Floor)	Surgical Clinics	Three	50
Drs. W. C. MacCarty and A. C. Broders	Pathologic Laboratory, St. Mary's Hospital	Demonstration in Fresh Tissue Pathology	Four	100
Dr. W. F. Braasch	Colonial Hospital (3rd Floor, Nurses' Desk)	Urologic Ward Rounds and Cystoscopic Technique	Two	5
Dr. P. P. Vinson.....	Kahler (11th Floor, Operating Room 3)	Esophageal Stricture	One	30
Dr. G. B. New.....	Worrell Hospital (3rd Floor, Room 1)	Surgical Clinic in Laryngology, Oral and Plastic Surgery	Four	10
Dr. W. L. Benedict...	Worrell Hospital (3rd Floor, Room 2)	Surgery of the Eye.....	Four	10
Dr. H. I. Lillie.....	Worrell Hospital (3rd Floor, Room 3)	Surgery of the Ear, Nose and Throat	Four	10
Dr. H. R. Lyons.....	Worrell Hospital (3rd Floor, Room 4)	Surgery of the Ear, Nose and Throat	Four	10
Dr. B. E. Hempstead..	Worrell Hospital (3rd Floor, Room 5)	Surgery of the Ear, Nose and Throat	Four	10
Drs. W. F. Braasch and J. L. Crenshaw	Mayo Clinic, 2nd Floor.....	Cystoscopic Technique and Interpretation of Pyelograms.....	Three	5
Dr. F. L. Smith.....	Mayo Clinic (Ground Floor, Desk C-B)	Demonstration of Methods of Post-Operative Care	One	10
Drs. M. C. Piper and D. F. Hallenbeck	Kahler (7th Floor, Hospital Desk) ..	Medical Ward Rounds.....	One	5

MONDAY AND TUESDAY FORENOON

June 19 and 20, 1922

Special Clinical Demonstration—Surgical and Medical

A. M.	BY	PLACE	NATURE	DURATION	ATTEN-
				HOURS	DANCE LIMITED TO
9:00	Drs. W. S. Lemon, H. M. Conner and F. W. Gaarde	Mayo Clinic (3rd Floor, Desk B-3) ..	Clinical Demonstrations of Thoracic Disease	One	10
10:00	Drs. A. H. Sanford and T. B. Magath	Mayo Clinic (2nd Floor, Desk B-2) ..	Demonstration of Clinical Laboratory Methods	One	10
10:00	Drs. B. S. Gardner and L. T. Austin	Mayo Clinic (1st Floor, Desk G-1) ..	Interpretation of X-Ray Dental Films	One	25
10:00	Drs. J. H. Stokes, P. A. O'Leary and W. H. Goeckerman	Worrell Hospital Annex, 3rd Floor..	Dermatosyphological Demonstration.	One	25
10:00	Drs. H. H. Bowing, A. DesJardins and Mr. H. O. Stearns	Currie Hospital, Desk H, 2nd Floor..	Radium and Roentgen-Ray Therapy, the Physics of Radium and Roentgen-Ray	One and One-half	20
11:00	Dr. L. W. Pollock...	Kahler (7th Floor Hospital Desk) ..	Enterology	One	10
11:00	Drs. W. L. Benedict and W. I. Lillie	Mayo Clinic (2nd Floor, Desk E-2) ..	Neurologic Ophthalmology	One	10

11:00	Drs. R. D. Carmen and A. B. Moore	Mayo Clinic (2nd Floor, Desk A-2) . . .	X-Ray Examination of the Thorax . . .	One	10
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MONDAY FORENOON ONLY

Special Clinical Demonstrations—Surgical and Medical

A. M.	By	PLACE	NATURE	DURATION HOURS	ATTEN- DANCE LIMITED TO
8:00	Dr. M. S. Henderson	Colonial Hospital	Orthopedic Ward Walk	One	5
8:00	Dr. W. S. Lemon (Clinical)	Assembly Room, 3rd Floor, Mayo Clinic	Symposium on Diseases of the Chest, Case Demonstrations	Two	100
	Dr. A. B. Moore (Roentgen-Ray)				
	Dr. C. A. Hedblom (Surgical)				
10:00		Assembly Room, 3rd Floor, Mayo Clinic (Monday only)	Symposium on Blood and Blood Forming Organs	Two	100
	Dr. T. L. Szlapka		The Diagnosis and Treatment of Pernicious Anemia		
	15 Minutes				
	Dr. A. H. Sanford		Grouping, Fragility and Duodenal Pigments		
	20 Minutes				
to	Dr. B. S. Eager		Remarks on Transfusions		
	15 Minutes				
	Dr. W. Ashby		Theories Concerning Blood Destruction		
	15 Minutes				
	Dr. S. F. Haines		Blood Volume Examinations		
	15 Minutes				
	Dr. M. B. Bonta		Unusual Types of Leukemia		
	15 Minutes				
	Dr. H. Z. Giffin		Splenectomy		
12:00	15 Minutes				

MONDAY AFTERNOON

June 19th, 2 P. M.

Methodist Church

Dr. William B. Coley	New York	End Results in 170 Cases of Sarcoma of the Long Bones Treated by Various Methods since 1910.
Dr. George E. Shambaugh	Chicago, Illinois	Otolaryngology and the General Practitioner.
Dr. Willis C. Campbell	Memphis, Tennessee	Mobilization of Joints with Bony Ankylosis.
Dr. Herman L. Kretschmer	Chicago, Illinois	The Diagnosis and Treatment of Stone in the Ureter.
Dr. George J. Heuer	Cincinnati, Ohio	Lung Abscesses.
Dr. Arthur B. Ancker	St. Paul, Minnesota	Hospital Standardization.

MONDAY EVENING

June 19th, 1922

High School

Banquet—6:00 o'clock P. M.

(Informal)

SCIENTIFIC PROGRAM

Banquet Hall, 7:30 o'clock P. M.

Dr. C. H. Mayo.....	Presiding.	
Dr. W. B. Cannon.....	Boston, Massachusetts	Some Recent Advances in the Physiology of Internal Secretion.
Dr. Judson Daland.....	Philadelphia, Pennsylvania	The Diagnosis of Focal Infection.
Dr. Fred H. Albee.....	New York City, New York.....	Reconstruction Surgery.
Dr. M. G. Seelig.....	St. Louis, Missouri.....	Bile Duct Anomalies as a Factor in Cholecystitis.

TUESDAY FORENOON
June 20th, 8:30 A. M.
Programs of General Meeting
Methodist Church
Symposium on Nephritis and Diabetes

8:00	Dr. N. M. Keith.....	Hypertension in Cardiac and Renal Disease.
8:30	Dr. Geo. E. Brown.....	Capillary Changes in Cardiorenal Disease. (With lantern demonstrations.)
9:00	Dr. L. G. Rowntree.....	Water Balance and Water Intoxication.
9:30	Dr. R. Fitz	An Improved Alimentary Glucose Tolerance Test.
10:00	Dr. R. M. Wilder.....	The Dietary Management of the Diabetic Patient.
10:30	Dr. E. C. Rosenow.....	Further Studies in Encephalitis and Epidemic Hiccough.
11:30	Dr. C. A. Hedblom.....	Demonstration of Thoracic Surgical Cases.
11:20	Dr. H. J. Lloyd, Mankato, Minn.....	Non-Surgical Drainage of the Biliary Tract.
11:00	Dr. Georgine Luden	Progress in Cancer Research.
12:00	Dr. J. E. Crewe, Rochester, Minn.....	Factors in Longevity.

TUESDAY FORENOON ONLY
Special Clinical Demonstrations—Surgical and Medical

A. M.	BY	PLACE	NATURE	ATTEN-	
				DURATION HOURS	DANCE LIMITED TO
8:00		Assembly Room, 3rd Floor, Mayo Clinic	Symposium on Gastro-intestinal Dis- ease	Two	100
	Dr. D. M. Berkman.....		Gastric Retention Symptoms, Com- plications and Management		
	15 Minutes				
	Dr. H. R. Hartman.....		Diagnostic and Therapeutic Aspects of Biliary Drainage		
	15 Minutes				
	Dr. W. Walters.....		Pre-operative Preparation of Patients with Obstructive Jaundice		
	15 Minutes				
	Dr. L. A. Buie.....		Proctoscopy and Its Value in Gen- eral Practice		
	15 Minutes				
	Dr. G. B. Eusterman.....		Gastro-enterologic Clinic with Case Demonstration		
	30 Minutes				
8:00	Dr. H. W. Meyerding..	Colonial Hospital	Orthopedic Ward Walk.....	One	5
10:00	Tuesday only	Assembly Room, 3rd Floor, Mayo			
	Drs. W. D. Sheldon,	Clinic	Neurologic Clinical Conference....	Two	100
	H. W. Woltman and				
	H. L. Parker				

TUESDAY AFTERNOON
June 20th, 2 P. M.
Methodist Church

Dr. Preston H. Hickey.....	Detroit, Michigan	Recent Advances in the Therapy of Carcinoma.
Dr. Nathaniel G. Alcock.....	Iowa City, Iowa.....	An Analysis of a Series of Cases of Renal Tuberculosis.
Dr. George V. I. Brown.....	Milwaukee, Wisconsin	Plastic Surgery in Civil Practice.
Dr. A. A. Law.....	Minneapolis, Minnesota	Reconstruction of Tibia by Utilizing the Fibula.
Dr. J. G. Cross.....	Minneapolis, Minnesota	Acute Benign Leukemia.
Dr. Albert G. Schulze.....	St. Paul, Minnesota.....	Concerning the Vomiting of Pregnancy and Its Treat- ment.

NORTHERN MINNESOTA MEDICAL ASSOCIATION

President—Dr. C. O. Estrem, Fergus Falls.

Vice President—Dr. Roy E. Swanson, Alexandria.

Secy.-Treas.—Willard L. Burnap, Fergus Falls.

COMMITTEES

PROGRAM

W. L. Burnap, M. D.....Fergus Falls

W. W. Will, M. D.....Bertha

C. B. Lewis, M. D.....St. Cloud

ENTERTAINMENT

L. H. Rutledge, M. D.....Detroit

E. E. Hoit, M. D.....Detroit

L. C. Weeks, M. D.....Detroit

W. D. Dix Detroit

Fred Dennis Detroit

REPRESENTATION

O. J. Hagen, M. D.....Moorhead

J. Nicholson, M. D.....Brainerd

ARRANGEMENT

O. O. Larson, M. D.....Detroit

J. E. Carman, M. D.....Detroit

Fred Dennis Detroit

H. L. Stoner Detroit

AUDITING

E. H. Smith, M. D.....Bemidji

H. C. Cooney, M. D.....Princeton

CENSORS

O. O. Larson, M. D.....Detroit

O. F. Mellby, M. D.....Thief River

O. E. Locken, M. D.....Crookston

The annual meeting of the Northern Minnesota Medical Association will be held in Detroit, Minn., June 5, 6 and 7, 1922.

The program will include clinics offered by the members and an interesting number of addresses by local and outside members of the profession will be delivered.

The program includes the following:

Dr. Paul B. Magnuson.....Chicago

Dr. Nelson M. Percy.....Chicago

Dr. H. M. Helmholtz Rochester

Dr. N. S. Henderson.....Rochester

Dr. O. W. Rowe.....Duluth

Dr. F. J. Hirschboeck.....Duluth

Dean Alfred Owre.....Minneapolis

Dr. E. K. Huenekens Minneapolis

Dr. F. L. Adair.....Minneapolis

Dr. E. L. Gardner.....Minneapolis

Dr. F. J. Corbett.....Minneapolis

Dr. C. A. Donaldson.....Minneapolis

Dr. Kenneth Phelps Minneapolis

Dr. Henry L. Ulrich.....Minneapolis

Dr. C. N. Hensel.....St. Paul

UPPER MISSISSIPPI VALLEY MEDICAL SOCIETY MEETING

The Spring Meeting of the Upper Mississippi Medical Society was held in Little Falls, Minn., on May 2, 1922. The following papers were read:

Legislative Problems—Dr. F. J. Savage, St. Paul, Minn. Discussed by Dr. J. G. Millspaugh, Little Falls, Minn.

Artificial Pneumothorax—Dr. Everett K. Geer, St. Paul, Minn. Discussed by Dr. J. Douglas, State Sanatorium, Minn., Dr. F. F. Callahan, Pokegama, Minn.

X-Ray Diagnosis of Tuberculosis—Dr. F. F. Callahan, Pokegama, Minn. Discussed by Dr. J. E. Douglas, State Sanatorium, Minn., Dr. E. K. Geer, St. Paul, Minn.

Herpes Zoster Ophthalmicus—Dr. A. V. Garlock, Bemidji, Minn. Discussed by Dr. C. G. Nordin, Brainerd, Minn., Dr. N. Nelson, Brainerd, Minn.

A Typhoid Case History with Unusual Complications—J. B. Holst, Little Falls, Minn. Discussed by Dr. L. M. Roberts, Little Falls, Minn., Dr. R. A. Beise, Brainerd, Minn.

X-Ray Therapy—Dr. Desjardens, Rochester, Minn. Discussed by Dr. R. A. Beise, Brainerd, Minn.

Goiter—Dr. T. L. Chapman, Duluth, Minn. Discussed by Dr. J. A. Thabes, Brainerd, Minn.

OF GENERAL INTEREST

Dr. R. H. Mattson of Minneapolis has located at Steven, Minn.

The Minnesota Neurological Society met in Rochester May 13.

Dr. Robert Forbes of Duluth is taking a post-graduate course at New York.

Dr. D. E. Seashore of Duluth is convalescing from an operation at St. Luke's Hospital.

Dr. and Mrs. Wallace Cole are receiving congratulations on the birth, May 14th, of a son.

Dr. August Kuhlmann, Melrose, has announced his candidacy for Coroner of his county.

Dr. and Mrs. J. P. Sedgwick and family of Minneapolis have returned from Los Angeles.

Dr. Hilding Anderson, formerly of Minneapolis, is now associated with Dr. D. E. Tilderquist of Duluth.

Dr. M. J. Fiksdal, formerly of the Peabody Hospital Clinic of Webster, S. D., has located at Appleton, Minn.

Dr. F. N. Hunt, Fairmont, has returned after spending six weeks in California.

Dr. J. L. Mills, graduate of Minnesota in 1921, has located in Winnebago City.

Dr. Nels Westby was elected mayor of Madison, Minnesota, at the city election April 4th, 1922.

Dr. and Mrs. L. G. Rowntree of Rochester are receiving congratulations on the birth of a daughter.

Dr. Jas. Farrage, Winnebago City, has been compelled to discontinue practice because of poor health.

It is reported that Dr. Dan Bessesen, son of Dr. Albert Bessesen of Minneapolis will locate at Albert Lea, Minn.

The Redwood-Brown County Medical Society will hold its annual meeting on June 15th in the Sleepy Eye State Park.

We are glad to report the recovery of Dr. W. H. McKenna of Austin, Minn., from a severe attack of pneumonia.

Dr. F. J. Bohland, Belle Plaine, has just recently returned from a winter's sojourn in California for the benefit of his health.

Dr. E. F. Conyngham, formerly of Missoula, Montana, has located at Underwood, Minn., where he will engage in practice.

A series of lectures by different members of the staff are being given at St. Mary's Hospital, Duluth, for internes and staff.

Dr. H. L. Lamb of Sauk Center left recently for Chicago, where he will take post-graduate work in medicine and surgery.

Dr. J. C. Jensen of Hendricks has gone to Phoenix, Arizona, with the hope that the change may prove beneficial to his health.

Dr. Robert Emmett Farr of Minneapolis read a paper on "Local Anesthesia" before the Chicago Medical Society on April 26th, last.

A new modern office building is being planned for Duluth downtown district, and many physicians and dentists are applying for space.

The Association of Resident and ex-Resident Physicians of the Mayo Clinic held its fourth annual meeting in Rochester, May 29 and 30.

Dr. A. A. Passer is serving his third consecutive term as president of the Village Council of Olivia, having been re-elected at the spring election.

Dr. M. P. Gerber is now located at Brainerd, Minn., associated with Drs. Thabes, Badeaux and Nordin, and is specializing in children's diseases.

Dr. Harry Zimmerman of St. Paul read a paper on "Mechanical Factors in Abdominal Drainage" before the St. Louis County Medical Society, April 20th.

Dr. C. S. Bigelow and wife of Two Harbors have returned home after a month's visit at Hutchinson, Kansas. Dr. and Mrs. Bigelow made the trip by automobile.

Dr. and Mrs. Clayton K. Williams, 2115 Dudley Ave., St. Paul, sailed Thursday on the Empress of Scotland from Quebec for a year's stay abroad. They will travel in Switzerland, where Mrs. Williams will study art. Dr. Williams will spend the greater part of the time in Munich, Zurich, and also in Switzerland.

Dr. Byron O. Mork of Worthington has gone to Norway for an extended vacation. While in Europe, Dr. Mork will visit the French battlefields and other points of interest.

Dr. Winter, who has resigned his fellowship in the Mayo Foundation, will engage in the practice of internal medicine in the Andrus, Garberson, Buskirk Clinic, Miles City, Montana.

Dr. W. H. von Lackum, of Chicago, has come to the Mayo Clinic as Associate in the Section on Urology, where he will take charge of the work of special urology and allied fields.

Dr. John J. Whyte, formerly of Castlewood, S. D., has removed to Chokio, Minn. Dr. Whyte formerly practiced in Minnesota, but at the close of the war, in which he saw service, he removed to South Dakota.

Dr. J. J. Eklund is president of the Duluth National Bank. This bank is experiencing unusually rapid growth and is now ready to move into its new stone building, construction of which is nearly completed.

The Lake City Hospital was closed March first, temporarily, to permit of a reorganization, especially along the lines of financial management. There does not seem to be any immediate prospect of its reopening.

Dr. Charles E. Proshek, who left Minnesota in 1919 to serve with the American Red Cross in Siberia, Russia, Poland, Greece and Montenegro, has returned to this country for a visit with his parents at New Prague, Minn.

The addition to St. Mary's Hospital, Rochester, is completed and was opened last month with appropriate ceremonies. This new building contains a new set of operating rooms furnished according to the latest ideas, including accommodations for the visiting physicians.

News comes that Dr. H. R. Weirick, former mayor of Hibbing, in charge of the Rood Hospital in South Hibbing, has signified his intentions of becoming a candidate for the House of Representatives, Minnesota Legislature. Here's wishing Dr. Weirick success in his campaign.

Dr. O. J. Hagen of Moorhead, who is a delegate from the Clay-Becker Medical Society, took in the meeting of the American Congress of Internal Medicine at Rochester, and also the Minneapolis Clinic Week, besides visiting other eastern cities. Mrs. Hagen accompanied him.

The Board of Governors of the Mayo Clinic has voted to install a radio receiving station in the lobby of the Clinic. Investigations are being made with regard to the type of instrument best suited for use and it is hoped that installation will be effected within the next three months.

Dr. Donald K. Bacon, son of Dr. L. C. Bacon of St. Paul, is associated with his father in the practice of medicine. After graduating from the University of Minnesota, Dr. Bacon spent about two years with Dr. Crile of Cleveland and was resident surgeon at the Harper Hospital in Detroit, Mich.

Dr. and Mrs. T. L. Birnberg of St. Paul sailed Saturday, May 13th. for an extended visit in European countries. During the tour Dr. and Mrs. Birnberg plan to visit Berlin, Hale, Vienna, Munich, Heidelberg and other points. They expect to return to the United States during the latter part of August.

Dr. G. A. Newman, physician to the Minnesota State Prison at Stillwater, who has been seriously ill for several months, during which time he has been a patient at St. Luke's Hospital, St. Paul, is reported as greatly improved. During Dr. Newman's absence his duties at the prison have been discharged by Dr. D. Kalinoff of Stillwater.

Dr. J. C. Rothenburg of Springfield has filed for the office of representative-at-large from Brown and Redwood counties. He is being opposed by E. C. Stahn, a farmer, who has run twice before with the backing of the Non-Partisan element. Dr. Rothenburg was very active on the draft board during the World War and is one of our most broad-minded, patriotic citizens.

At the last meeting of the Park Region Medical Society, Dr. A. B. Cole of Fergus Falls was voted an honorary member of the society. Dr. Cole is one of the pioneer physi-

cians of the western part of the state and has been very active in his profession until last winter when he found it necessary to go South for his health. He returned a few weeks ago much improved in health and is now limiting his work mostly to office practice.

The new addition of St. Mary's Hospital, Duluth, is now nearing completion. It is a beautiful structure and embodies the most modern ideas in hospital construction. This addition together with the million dollar hospital to replace St. Luke's, for which the money has been raised by popular subscription, and the A. M. Miller City Hospital, for the construction of which \$600,000 has been bequeathed, will give Duluth hospital facilities far above the average for cities its size.

Dr. H. T. McGuigan and Mrs. McGuigan of Red Wing, sailed recently for Europe on the Cunard liner Mauretania. Dr. McGuigan will attend a number of clinics and take post-graduate work. After landing at Cherbourg, France, the tourists plan to visit Paris, the battlefields of the World War, Coblenz, and also will attend the Passion Play at Oberammergau. The doctor also expects to spend about a month in clinical work in hospitals at Edinburgh, Scotland, and in England. Dr. and Mrs. McGuigan expect to return home late in September.

PHYSICIANS LICENSED AT THE APRIL, 1922, EXAMINATION TO PRACTICE IN MINNESOTA

BY EXAMINATION

<i>Name</i>	<i>School of Graduation</i>	<i>Address</i>
Bachman, Harry Wilson.....	U. of Pa., M. D., 1917.....	Rochester, Minn.
Bowler, John Pollard.....	Harvard, M. D., 1919.....	Rochester, Minn.
Greene, Carl Hartley.....	Johns Hopkins, M. D., 1921.....	Rochester, Minn.
Jackson, Geo. Henry, Jr.....	Harvard, M. D., 1918.....	Rochester, Minn.
Magoun, Jas. Albert Hughes, Jr....	U. of Pa., M. D., 1916.....	Rochester, Minn.
Moench, Laura Mary.....	Johns Hopkins, M. D., 1919.....	Rochester, Minn.
Reid, John Spence.....	Toronto, M. B., 1920.....	Rochester, Minn.
Stark, Wm. Berkeley.....	Toronto, M. B., 1915.....	Rochester, Minn.

THROUGH RECIPROCITY

Athens, Alvin Glenwood.....	Johns Hopkins, M. D., 1919.....	Buhl, Minn.
Barborka, Clifford Joseph.....	Rush, M. D., 1921.....	Rochester, Minn.
Bauguess, Harry	Omaha Med. Col., M. D., 1899.....	Minneapolis, 1206 4th St.
Berry, Walter Durant.....	Med. Col., Ohio, M. D., 1897.....	Battle Lake, Minn.
Burns, Robert Emmett.....	U. of Pa., M. D., 1919.....	Rochester, Minn.
Calene, John Lucian.....	Rush, M. D., 1921.....	Rochester, Minn.
Dunlap, Harold Foster.....	Indiana U. Sch. of Med., 1920.....	Rochester, Minn.
Foley, Frederic Eugene Basil.....	Johns Hopkins, M. D., 1918.....	St. Paul, care Miller Clinic
Gilmer, Peachy Robert.....	Tulane, M. D., 1921.....	Rochester, Minn.
Hansel, French Keller.....	St. Louis U., M. D., 1918.....	Rochester, Minn.
Haynes, Aaron Lorenzo.....	Ia. Col. P. & S., M. D., 1895.....	New Market, Minn.
Hench, Philip Showalter.....	U. of Pittsburgh, M. D., 1920.....	Rochester, Minn.
Hoyer, Hans August.....	Detroit Col. Med. & Surg., M. D., 1921.....	Delavan, Minn.
Kingsbury, Ernest Mills.....	U. of Ia. (Homeo. Dept.), M. D., 1906.....	Clearwater, Minn.
Koucky, John Douglas.....	Rush, M. D., 1921.....	Rochester, Minn.
Larrabee, Scott G.....	Bowdoin, M. D., 1906.....	St. Paul, Piedmont Apt.
Lorenzen, Fredrick Charles.....	Wis. Col. P. & S., M. D., 1909.....	Elgin, N. Dak.
Swan, Theo. Strong.....	U. of Pa., M. D., 1920.....	Rochester, Minn.

NATIONAL BOARD CREDENTIALS

Giordano, Alfred Sabato.....	Syracuse Univ., M. D., 1920.....	Rochester, Minn.
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PROGRESS

Abstracts to be submitted to Section Supervisors.

MEDICINE

ABSTRACTS FROM RECENT MEDICAL AND PUBLIC HEALTH PAPERS, PREPARED BY DIRECTOR VENEREAL DISEASES U. S. PUBLIC HEALTH SERVICE

DIAGNOSIS OF INCIPIENT TABES: G. C. Bolton (Nederlandsch Tijdschrift v. Geneeskunde, Amsterdam, October 8, 1921; Journal A. M. A., January 28, 1922). Bolton describes some cases of unmistakable incipient tabes in which none of the four specific tests of spinal fluid or tests of the blood elicited a positive reaction. In some cases isolated paralysis of the ocular muscles, beginning atrophy of the optic nerve, with sluggish pupil reactions or anisocoria, may be regarded as testifying to tabes, even in the absence of all other signs, as also a symmetrical hard ulcer on the soles, the falling out of the hair and of sound teeth, a spontaneous fracture, or isolated crises in the larynx, bladder, stomach or arms. These may long precede other manifestations of the disease.

THE RATIONALE OF THE WASSERMANN REACTION: J. E. R. McDonagh (Lancet, London, December 24, 1921). "Some have laid great stress upon the possible interpretations of a positive and negative reaction, but those with large clinical experience are coming to the conclusion that a negative reaction signifies nothing, and that a positive reaction means no more than that the patient has had syphilis." The main object of this paper is to detail as far as possible the changes undergone by the protein particles in syphilis and to throw some light on certain problems which so far have remained unsolved.

STANDARDIZATION OF SUSPENSION OF RED BLOOD CELLS FOR WASSERMANN TESTS: Joseph W. Bigger (Lancet, London, December 31, 1921). "Methods usually adopted for making suspensions of red blood cells for the Wassermann test are very rough and the resulting suspensions vary greatly in strength." Such variations may introduce considerable error in the results of the test. A simple and rapid method of standardizing red blood cells is described. This method was controlled by counting the number of cells per c.c. in 12 suspensions and was found to be accurate.

TREATMENT OF SYPHILIS: J. E. R. McDonagh (Medical Press, London, December 28, 1921). McDonagh emphasizes the fact that treatment should be such as to increase the individual's resistance to the disease. "This can only be brought about by stimulating and not by destroying the resisting substance, and unfortunately in the majority of cases being treated today the latter and not the former is both aimed at and achieved." He sums up his conclusions: (1) that the chemotherapeutic agents cause the symptoms to vanish quicker, but bring us no nearer to curing the disease; (2) that the word cure should never be used, as all proof is wanting in any special case that a recurrence will never appear; (3) that each case must be treated individually and for at least two years; (4) that no reliance can be placed on tests at present in vogue for regulating treatment.

SYPHILITIC JOINT DISEASE: Dupont (Revue de Chirurgie, Paris, 1921; Journal A. M. A., January 21, 1922). Dupont found the multiplicity of the manifestations in the joint a feature of the syphilitic joint cases, as also that symmetrical articulations were usually involved, at the same time, or with a longer or shorter interval. The long duration of the joint affection and the frequent relapses are special features, as also the prompt and complete cure under treatment for syphilis. Radiography may be misleading. Nearly all the cases he has encountered had been mistaken for tuberculous, gonococcus, rheumatic or traumatic arthritis. In certain cases, traumatic injury of the joint seemed to have been instrumental in attracting the syphilitic lesion to develop at this point. In one young man an acute dysenteriform arthritis prepared the soil for a specific arthritis from inherited syphilis.

SIGNIFICANCE OF BIOLOGIC REACTIONS IN SYPHILIS OF THE CENTRAL NERVOUS SYSTEM: David J. Kaliski and Israel Strauss (Arch. of Neur. and Psychiatry, January, 1922). With notes on treatment, especially intraspinal. From the Neurologic Service of the Mt. Sinai Hospital, New York, authors state: "We believe that a mere increase in cells (pleocytosis) and in protein (globulin) with a transient Wassermann reaction points to irritation of the pia-arachnoid of the nature of a general septicemic reaction, temporary, and of doubtful significance as to the future involvement of the neuraxis. * * * The constant presence of cells, globulin and a definite Wassermann reaction in all dilutions in early syphilis indicate a more serious membrane involvement, possibly the earliest signs of a definite organic involvement of the neuraxis."

Authors hold that intraspinal treatment is of very limited value and give their reasons for this belief.

Two outlines for treatment are given at the close of the articles, one for syphilis of the central nervous system, and one for early constitutional syphilis.

ABSTRACT OF A PAPER ON: SPINAL SUBARACHNOID BLOCKAGE, DETERMINED BY COMBINED CISTERN AND LUMBAR PUNCTURE

JAMES D. AYER

(The Arch. of Neurology and Psychiatry, January, 1922)

The so-called Froin syndrome in spinal fluid is almost pathognomonic of compression of the spinal cord, but its clinical value is almost nil. This is found usually only after destruction of the cord, too late for operative or therapeutic procedure. More recently it has been known that a relative protein increase in the spinal fluid is frequently found below a cord tumor, but this also could hardly be considered more than suggestive of cord contraction.

Ayer has shown in a previous paper that by combining a cistern and lumbar puncture he was able to demonstrate differences in the fluids from two areas, indicating that an obstruction existed between the two. He has now collected data from 71 such examinations and 65 patients. The patient is placed on his side so that the points of puncture in the cistern and lumbar regions are on the same horizontal plane. After local anesthesia is employed with procaine, punctures are made in the cisterna magna and the lumbar sac; a glass manometer being then attached to each needle. The manometric pressure should

be about the same in the two areas. Oscillations occur with pulse and respiration, and changes in pressure on coughing and deep breathing, but are most marked on employing pressure over the jugular vein in the neck. About 5 c.c. are then withdrawn through the lumbar needle, when the pressure should drop uniformly in both manometers. If obstruction occurs, the fall is pronounced in the lumbar region, but little change occurs in the pressure in the cistern area. Conversely, if pressure on the jugulars is employed, in cases in which spinal subarachnoid block is present, a rise in pressure in the cistern manometer is entirely out of proportion to the rise in pressure in the lumbar area. It is similarly noted what effect 5 c.c. of fluid in the cistern needle has to do with the relative pressure in the lumbar manometer. Fluid from the two areas is examined in the usual manner for cells, Wassermann, colloidal gold, and for total protein; the latter being particularly important. By observing the effect on patients with optic nerve atrophy in general paresis, in whom the cisterna magna route had been employed for serum administration, they were able to establish data for normal individuals, and it was found that all changes which occurred took place promptly and to an equal degree in both manometers, regardless as to whether pressure was employed on the jugulars and fluid withdrawn from one or the other area.

The author cites several cases showing indications of subarachnoid block, all of which showed variations in the hydrodynamic pressures in the two areas, and also in the protein contents of the two fluids. These cases were all proved to have subarachnoid block by operation or by the beneficial effect of anti-syphilitic treatment.

It is not to be thought that every cord tumor will present the picture of block, but it is clearly shown that cord tumor frequently presents a block very early. Says that positive findings are of great value, but negative findings also are of relative importance.

The method is not without danger, and should not be employed except in cases which clinically show at least some definite evidences of interference with the circulation of the spinal fluid.

F. J. HIRSCHBOECK.

ABSTRACT ON: TYPES OF DIABETES MELLITUS

(Med. Clinics of North America, September, 1921)

Wilder attempts to classify the cases of diabetes mellitus encountered in 1920 at the Mayo Clinic, purely from the clinical standpoint, emphasizing the impossibility of making any pathologic classification which would be of definite value.

His series consisted of 298 patients under his observation during that year, and he groups them as follows:

(1) The cases of acute diabetes, characterized especially by abrupt onset, gradually falling carbohydrate tolerance, strength and weight. These patients have a tendency toward acidosis, the average age is 20 years, and comprise 19 per cent of the total. These are the classic, severe, fulminating diabetic cases.

(2) Vascular diabetes associated with hypertension, arteriosclerosis, or both, with or without renal complications. This is the most numerous group, and comprises 30 per cent of the entire series. With this type everyone is familiar. The blood sugar frequently is high,—out of

proportion to the usual findings in the urine. The patients are particularly prone to the diabetic complications incident to the arterial changes, such as gangrene, diabetic retinitis, cataract, paresthesias, etc.

(3) Diabetes of obesity: In classifying these cases the author has been careful to eliminate those which belong to Group 2 or Group 4, but nevertheless are overweight. In excluding these, he finds that there still is a moiety of 15 per cent which should be placed in this group. They usually respond to treatment very satisfactorily and are comparatively benign, but have a tendency to acidosis and starve too quickly in treating them.

(4) Interstitial pancreatitis: This is the surgical group, usually associated with gall bladder disease and pancreatic changes. About 20 per cent belong to this group. They usually respond quite well to surgical interference, and do well postoperatively.

(5) Miscellaneous persistent glycosuria: In this group he has placed patients who did not fall into any of the other groups, 5 cases having tumors in the pancreas, 15 glycosuria with hyperthyroidism, 5 with tumors of the brain, 4 with renal diabetes, 1 with lues, and 24 remaining unclassified.

F. J. HIRSCHBOECK.

TUBERCULOMA OF THE ISCHIO-RECTAL FOSSA— CASE REPORT

CURTIS C. MECHLING
(Am. Proct. Soc., 1921)

The writer reported the following case:

The patient was a locomotive engineer, who had a slowly developing lump in the ischio-rectal fossa, becoming more tender as the size increased. The lump was hard, fixed and apparently attached to the ischium. There was no depreciation in the patient's general health, and the location of the tumor alone caused his inability to follow his usual occupation.

X-ray examination revealed no bone defects. Tentative diagnosis of lipoma was made, and the tumor resected, using local anesthesia. The incision was crescentic and inside the tuberosity of ischium, to place scar where there would be little wear on it. Fixation of the tumor was very firm, owing to the large amount of surrounding connective tissue. Section of tumor released much thin pus. The pathological diagnosis was tubercle. There was no other evidence of tuberculous process in the patient.

The patient is now well and working daily, but should be considered a tuberculosis suspect, and should be under inspection at intervals for other evidence of the disease.

A CLASSIFICATION OF PROCTOLOGIC FISTULÆ: TREATMENT OF EACH VARIETY

J. RAWSON PENNINGTON
(Am. Proct. Soc., 1921)

The writer stated that many rectal diseases would receive better attention and treatment if more attention were given to the embryology, anatomy, physiology and hygiene of the rectum, anus, and contiguous structures. For years past he has emphasized the importance of the pectinate line as a guide to rectal diseases, for the great majority of these affections start to develop at the line itself or nearby. Quite recently he has enlarged this conception to take in the rectal fascia, and has christened the arrangement the

"splacho-somatic funnel." The sinuses, crypts and diverticula at the pectinate line form admirable catch-basins for foreign bodies and bacteria, and this unfortunate fitness is shown by the fact that about 85 to 90 per cent of fistulæ open in this region. Classifying, he said that we have an anorectal fistula when the opening is located at the pectinate line; an anal fistula when in the anus; a rectal when through the wall of the rectum proper, and a recto-sigmoidal when through the wall of the bowel at the recto-sigmoid junction. Watering-pot, multiple, horseshoe, and other so-called varieties, are merely expressions of complexity, multiplicity, position, or shape of one or the other of the foregoing divisions or combinations of them.

He then said that each type of fistula calls for a different plan of relief, since it would be poor judgment to apply the same treatment to a simple anal channel—a perineal fistula, for instance—as is applied to one high up. Beginning with the simplest form, we have purely a local condition—perineal or other—which requires only incision, and should heal promptly. When we deal with an ano-rectal fistula, the state of affairs is more complicated, and complete resection of the tract and immediate suture, the procedure he has long advocated and practiced, will give the best results. When we get higher in the bowel and are confronted with a true rectal fistula, the inner orifice being in the ampulla two or three inches from the anus, excision with immediate suture is impracticable, and his "seton method" is called for. In recto-sigmoidal fistula the condition is still more grave, and here his method of applying the ligature has given splendid results. He stated, finally, that a rectal fistula, with a single tract and only one opening into the rectum, is much more serious than an anal fistula, with two or more openings into the anus and 25 or more openings on the buttocks. In fact, the number of external openings has but little to do with the relative gravity of the case.

RELATION OF PULMONARY AND ANO-RECTAL TUBERCULOSIS TO FISTULA-IN-ANO

SAMUEL G. GANT
(Am. Proct. Soc., 1921)

The writer said that fistula-in-ano is seldom associated with pulmonary tuberculosis, and that of five thousand fistulæ, operated on by him, less than 10 per cent were tubercular. True, tubercular sinuses are usually curable by operation unless the patients are remarkably devitalized, and lung involvement and skin affections do not result from a cure, as some believe. Fistulæ, simple or tubercular, heal much slower when complicated by pulmonary tuberculosis and when cauterized, than when treated by mild stimulants like methylene blue 10 per cent. Tubercular sinuses associated with extensive involvement of mucosa and peri-anal skin may not heal, as they are usually secondary to serious lung involvement.

Tubercular fistulæ are diagnosed by their large irregular openings and sinuses, undermined skin, abundant rice-water-like discharge, and by finding tubercle bacilli in pus or tissue from the infected area.

Palliative treatment, hygienic measures, forced feeding, etc., help to build up the patient for operation and prolong life, but do not cure tubercular sinuses or ordinary fistulæ when the patient has pulmonary tuberculosis. Operation is the procedure of choice when the patient has reasonable

vitality. The technique consists of incising tracts and trimming of overhanging edges of mucosa and skin, and then applying the cautery to raw areas to forestall extension of infection by way of the lymphatics.

Etherization stimulates latent and active foci in the lung and is often responsible for death. The writer invariably employs local anesthesia in this class of cases, keeps the patients in the hospital but a short time, and thereafter requires them to spend their time in the open air, and observe the usual hygienic measures prescribed for patients afflicted with tubercular foci in the lungs.

The prognosis is fairly good except in cases where the patient is almost exhausted by lesions in the lung and bowel, but healing is slow whether the tubercular lesion is local or involves both the peri-anal region and lung.

SURGERY

PRESERVATION OF THE ANAL MUSCLES IN OPERATIONS FOR RECTAL FISTULÆ

GRANVILLE S. HANES
(Am. Proct. Soc., 1921)

The writer expressed himself as follows:

1. If there are no serious complications almost every rectal abscess or fistula should be cured by operation with slight or no impairment of anal control. There is no test put upon the anal muscles in the way of controlling the rectal outlet when the patient is constipated, but only when the feces are soft or quite thin.

2. When there is an internal fistulous opening it usually passes through the anal wall at the junction of the rectum and anus, or, more correctly, at the recto-proctodeal junction. It is never through the wall of the rectum, unless there is some diseased state of the mucosa, as in ulcerations, strictures, etc.

3. In operating, the affected tissues, external to the anal and rectal walls, are dealt with in whatever manner best suits the operator. All the tissues surrounding the fistulous perforation through the anal wall are dissected away, leaving the external perforation in easy view. It can be brought into better view by inserting the index finger into the rectum and pushing that part of the wall outward. If there is redundant tissue (piles) inside the canal it should all be removed. Any ulcerated areas should be cauterized, especially at the internal perforation. The opening through the anal wall may be cauterized with a small Paquelin point or some chemical agent. Care should be exercised not to enlarge the perforation.

4. After-care determines the success one has in treating rectal fistulæ. The external wound must be kept under careful observation, and the anal canal occasionally dilated. If the opening has not healed when the outside wound is about closed, a local anesthetic may be used and the muscles divided. There will then be the least possible separation of the circular fibers and, therefore, a minimum impairment to control.

5. The object to be obtained in operating by this method is to avoid, if possible, the destruction of the contour of the anal opening. If the parts maintain their normal rela-

tions and the wounds heal with no sulci in the anal wall, the patient's control will be secure.

RETROPERITONEAL LIPOMAS—REPORT OF TWELVE CASES

MASSON, J. C., and HORGAN, E. J.

(Southern Minnesota Medical Association, December 5)

In a review of the literature it was found that most cases of retroperitoneal tumors are only diagnosed at operation. Some tumors, even then, have been thought malignant and inoperable.

The most striking fact about the tumor is the absence of symptoms due to it. In only four of the twelve cases, wherein the growth was degenerating, were there acute symptoms. In the remainder the presence of the tumor, variously diagnosed as of renal origin, ovarian cyst, and so forth, was the main indication for interference. Pain was severe in only one case. Three patients had ascites, but none had signs of obstruction.

The age of the patients varied from forty to seventy-two years, the average being fifty-five. There were five males and seven females, and the average duration of symptoms was three years.

The tumor is usually ovoid and movable, with a multiglobular surface and a doughy consistency. Its position varies with its origin, the most usual source being the perirenal fat. It may, however, develop from any retroperitoneal fat and in some instances may be palpable through the vagina or rectum.

The earliest case in which operation was reported is that of Lizars in 1824. This writer had expected to find an ovarian tumor.

In the differential diagnosis it should be borne in mind that ovarian tumors are usually more tense and have not the doughy consistency of the lipoma. Pregnancy should be excluded by the history and renal tumors by cystoscopic methods. The spleen is usually more firm and bears a notch in its free border, but it is easy to confound the two. In the majority of cases seen at the Mayo Clinic the true nature of the tumor was only learned at operation.

Fibromyomas and sarcomas are seen in the same situations. The former type of tumor is firm and cachexia produced by a sarcoma of like size would be very evident. Lipomas may undergo sarcomatous change.

The cause of lipomas is not known. It is, however, noted that in two of these cases the tumor developed in the perirenal fat after operations on the kidney.

Operation for removal of the growth may be very difficult if the tumor has displaced important vessels at the root of the mesentery, at the hilus of the kidney, or above the spine, and especially if degeneration has taken place.

In cases of large growths a midline incision is indicated and an attempt should be made to remove the entire mass, since recurrences are common.

A histologic description is given with clinical diagnoses, and attachments, location, and weight of the tumor in the cases reported.

DISCUSSION ON THE PAPER OF DR. J. C. MASSON

DR. T. L. CHAPMAN, Duluth: We are greatly indebted to Dr. Masson for the exposition of a most remarkable

and unusual condition. In anticipating some discussion upon this subject, I had the pleasure of running over forty-eight cases in the literature which comprised nearly all of those down to 1906 or thereabouts, and perhaps nearly two-thirds of those reported at length in the literature.

The original classification was made not very much later than 1906, at which time the division of the sources of the growth was made for the first time into three classes which Dr. Masson spoke of—those from the perirenal tissue; those of indeterminate origin, which may be from any source of fat in the postperitoneal space; and those from the intermesenteric fat. There is nothing I can add that will throw any light on the beginnings of these cases. The most interesting feature concerning them is their extreme difficulty of surgical management in view of their pathological basis, which is so trifling in itself.

It is noteworthy how remarkably this type of fat growths can insinuate itself between the folds of the mesentery and push the intestine up until the gut may be flattened out upon the apex of the mass caused by the tumor. This involves also, of course, a surrounding or a pushing aside of important blood vessels to the intestine and even the general systemic circulation by surrounding the main trunks. One can only deduce from the literature that operations of this type are dangerous to a great degree for the following reasons:

The enormous size of the growths; the manner and location of their progress and their concealment of essential structures, damage to which may cause loss of a patient's life.

CLOSURE OF THE ABDOMEN WITHOUT DRAINAGE AFTER CHOLECYSTECTOMY AND CHOLEDOCHOTOMY—H. M. Richter (Surg., Gyn. and Obst. 34, Feb., 1922—180-182): The earlier workers in gall-tract surgery often closed the abdomen without drainage, but on account of the resultant unpleasant sequelæ it became routine practice to use postoperative drainage. At the present time there is a growing tendency to close without drainage, although individual practice varies greatly. The author has closed the abdomen without drainage in infective conditions associated with a frankly developed peritonitis whenever he has been able to remove the source of continuous reinfection, except when the peritonitis has been far advanced. His list of cases includes those of acute appendicitis with peritonitis in children and adults, and perforated gastric and duodenal ulcers. There has been no death among his cases of appendicitis, which include fifty cases of children under thirteen years. In twenty consecutive cases of perforated gastric ulcer there were two deaths, one moribund patient dying six hours following operation, and the other five weeks following operation from a subphrenic abscess.

Operations on the biliary structures are analogous to gastro-intestinal surgery in that the peritoneal toilet can be quite perfectly completed, and have the advantage over intestinal surgery in dealing with less infective material.

Various discussions as to definite closure of the abdomen in gall-tract surgery, taken with the author's experience, suggest the following statement regarding cholecystectomy, choledochotomy, and operative mortality.

Cholecystectomy.—In cholecystectomy the following procedure should be followed: (1) The cystic duct should be clamped, cut and ligated with fine catgut; (2) the stump of the cystic duct should be left free after ligation, not covered in by folds of peritoneum; (3) the raw surface of the liver left by removal of the gall-bladder needs only temporary packing during the remainder of the operation and does not require suturing, which tends to produce dead space; (4) bile leakage from the raw surface of the liver is of slight importance; (5) a drain placed down to the row of sutures in the cystic duct is apt to cause leakage; (6) all cases do not permit closure without drainage since (a) persistent oozing from the liver demands packing, (b) jaundice usually demands drainage, and (c) unusually active infections or suppuration outside the gall-bladder demand drainage, and (7) the omission of drainage lessens the postoperative discomfort.

Choledochotomy.—In choledochotomy, where the common bile duct can be sutured and the abdomen closed without drainage, the advantages of the procedure are the same as in cholecystectomy. The maximum bile pressure in the duct is much less than the resistance of a line of fine sutures. The contents of the common duct are not nearly so infective as the contents of the bowel which is closed without drainage. The peritoneal coat, or, lacking that, a piece of omentum, must be included in the line of suture.

To suture the common duct and close the abdomen without drainage presupposes (1) that the peritoneal coat of the duct has not been rendered useless, (2) that the suture materials and needles are of the smallest, (3) that no stones are left or strictures overlooked, (4) that the diameter of the duct is sufficient to permit two lines of sutures with ample room for traumatic swelling, which must be expected, and (5) that the walls of the duct are not too infiltrated or too stiff to permit easy manipulation.

The abdomen should not be closed in duct cases in the presence of jaundice or acute infection.

The percentage of cases in which the abdomen can be closed with safety after choledochotomy is probably smaller than after cholecystectomy.

Operative mortality.—Mortality statistics that are not explanatory are misleading, particularly in a small series of cases. In more than 100 cholecystectomies in the author's series there were two deaths, one of coma in a case of cirrhosis of the liver with obliterative peritonitis and an associated nephritis, the other following several days of frank pneumonia.

Drainage of the peritoneal cavity is done too frequently. Removal of the source of continuous reinfection almost always justifies closure without drainage.

In the majority of gall-tract cases no considerable infection is present.

The author unhesitatingly advocates closure without drainage after cholecystectomy in suitable cases. Closure after operations on the common duct requires far more technical dexterity, but gives unusually satisfactory results.

W. H. SPRUNT.

GYNECOLOGY AND OBSTETRICS

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RADIUM THERAPY IN CANCER OF THE NECK AND BODY OF THE UTERUS—Henri Hartmann (*Gyn. et Obstetrique*, vol. 4, No. 4): Hartmann states that cancer of the cervix has received more benefit from radium than from surgery. The apparent cures are prompt and remarkable. Histological examination of the uterus subsequently removed at operation or autopsy has repeatedly demonstrated complete destruction of all cancer cells in the uterus, though they may persist in the parametrium or pelvic lymph nodes. He quotes figures from the French and American literature with many clinical cures, some of five and six years' standing. Recurrences are usually remote. Deep penetration from radium is uncertain and can not be depended upon to reach pelvic structures.

Technique is discussed at some length. The author prefers a single large dose of radium well filtered. The tube is placed in the uterine canal, and, in some cases, extra tubes are held in the vaginal cul-de-sac by special apparatus, and well packed. He describes a combined method of Proust which is recommended. The uterus is exposed through low laparotomy incision, the internal iliac vessels are ligated and small doses of radium on special carriers are introduced along the vessels to the parametrium. Similar carriers with radium can be introduced anteriorly near the cornua. The carriers are brought out through the abdominal wound and withdrawn at the proper time.

Hartmann advises against hysterectomy following successful radium treatment as being an unjustifiable risk. The use of radium following hysterectomy he regards as presenting great danger of injury to the bladder or rectum. Cancer of the body, he holds to be definitely curable by total hysterectomy and this is his choice. Hartmann prefers radium for all cancers of the cervix except under the following circumstances: 1. Advanced disease or recurrences with large pelvic masses. In these there can only be temporary and partial relief. 2. Extensive involvement of the wall of the bladder or rectum. Small doses are useless and large ones cause fistulae. 3. Pelvic inflammatory disease. 4. With early cancer, which is definitely operable, there is still difference of opinion, though many favor radium for these.

ARCHIBALD L. McDONALD.

RADIO-THERAPY OF UTERINE FIBROIDS—J. L. Faure (*Gyn. et Obstetrique*, *Revue Mens.*, vol. 4, No. 4): Faure stands as one of the leading abdominal surgeons of France, who has made notable contributions to the development of operative gynecology, particularly hysterectomy. He has followed the use of radium in his own clinic and in the literature for more than ten years and has been deeply impressed by the results obtained. His judgment therefore represents the conservative opinion of his country. He holds that the results are uniform and

definite both as regards control of hemorrhage and decrease in size of the tumor. Radium acts upon all of the genital structures: uterine mucosa, musculature, and blood-vessels, and upon the ovaries. However, there are many cases where the ovaries apparently escape, as witnessed by cases where control of bleeding is immediate or where the tumor disappears but regular menstruation continues. Faure accepts the advantages of radium: rapidity of action, which is prompt and continuous, and simplicity of technique, which he prefers without general anesthesia. He uses a moderate dose, 25 to 150 milligrams for from 12 to 60 hours, and makes an effort to preserve menstruation. If used with proper care and with proper indications, there should be no untoward effects. Burns can be prevented, infection from intra-uterine manipulation is rare, severe exacerbation of chronic pelvic inflammatory disease have been reported. The induction of the premature menopause in young women. Faure believes to be unavoidable and holds this as a capital objection to this treatment. Danger of encouraging malignant degeneration of tumors he does not accept as proven. With present technique radium is preferable to Roentgen ray therapy, though new developments in the latter may change this opinion, since the x-ray dosage may be controlled and does not require intra-uterine manipulation.

Faure then compares the results obtained with hysterectomy, which he regards as the most perfect and ideal operation in surgery. The cures from operation are absolute, there can be no recurrence of symptoms or growths, and restoration to health is rapid. Conservation of the ovarian function or even of the uterus is often possible. He holds that the choice would always be for surgical treatment were it not for the mortality of operation, which he accepts as 5 per cent. However, this means 95 per cent cures, which may be regarded as satisfactory for any form of therapy. Furthermore, Faure holds that if one considers the untoward complications of radium— inflammatory reactions, errors of diagnosis which allow development of unrecognized malignancy, and failures which later require operation under less favorable circumstances—the indirectly bad results will exceed those from surgery. He feels that this point is still debatable in the average case, and is certainly true unless the patients are carefully selected for radium therapy.

He would exclude from radium:

1. Those where the exact diagnosis between simple fibroid, and ovarian cyst, or other pelvic condition is uncertain.
2. Young women where there is possibility of a conservative operation.
3. Previous unsuccessful radium treatment.
4. Complicating inflammatory lesions of the pelvis, or lower abdomen.
5. Suspicion of gangrene, infection or degeneration of fibroids.
6. Submucous or subserous pedunculated tumors.
7. Fibroids complicating pregnancy causing dystocia.
8. Large rapidly growing tumors causing pressure.
9. Where there is suspicion of malignancy.

In general, all tumors of doubtful nature of behavior. Therefore, Faure concludes that in spite of the admitted excellent results of radium therapy in properly selected cases, there is still a vast field for surgery.

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PEDIATRICS

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EGG YOLK IN INFANT FEEDING—Adolph G. De Sanctis (Arch. of Ped., Feb., 1922): During the last two years, the writer has used egg yolk as an adjunct in difficult feeding cases. Its value was recognized in certain cases which did not do well on various formulas and in which as much food was given as was possible. In an infant that was taking and assimilating more than the normal amount of calories per day and did not gain, there was added to its daily ration one teaspoonful of the yolk of a soft-boiled egg; the response was immediate. The child gained in weight and the general condition improved. The yolk was gradually increased until the whole yolk was added daily. The infant gained from 8 to 12 ounces weekly. That the gain of weight was due to the extra calories added can be ruled out because a three-months-old infant did not respond when 35 calories per pound were given daily.

The writer believes the gain in weight was due to the effect of the fat soluble B vitamine contained in egg yolk. Many other cases were tried with similar results.

The fact that orange juice was given before the addition of egg yolk would rule out that failure to gain in weight was due to a deficiency of the antiscorbutic vitamine. It was found that the egg yolk agreed with infants as early as the second month and very rarely caused any gastrointestinal disturbance.

R. N. ANDREWS.

WHEN SHALL THE MEMBRANA TYMPANI BE INCISED, AND WHEN IS RE-INCISION INDICATED—Walter Lester Carr (Arch. of Ped., Feb., 1922): A routine examination of the ears and throat should be made in all infectious diseases, and in every condition where there is a question as to the cause of irregular high temperature, with or without pain. A child may have pain without a rise of temperature or at the most a degree above normal, or there may be restlessness and irritability without temperature and pain.

If the tympanum is found red and bulging the incision is made at once. It may be possible to abort a mild condition by the use of adrenalin solution, 1 part to 4 or 5 of normal saline solution instilled into the nares so that it comes in contact with the swollen pharyngeal tissue. If the structures of the pharynx and tonsils are reddened and swollen, so that there is blocking of the outlets of the eustachian tubes, an incision is advisable. An incision of the drum is not, however, the whole treatment, as in addition to irrigations of the external auditory canal local application to the pharynx and tonsils of argyrol or a similar preparation are necessary.

Although a patient cannot be protected against mastoid disease associated with a general systemic infection, it is possible to give some drainage through the external meatus.

Many nervous children get relief by local heat, and instillations of warm boric acid solution into the ear.

In the writer's experience, patients who have relief only when chloroform vapor is blown into the ear require incision. Smears after incision showed streptococcus, pneumococcus, of different types, Friedlander's bacillus, staphylococcus and catarrhalis.

Re-incision may be required if a primary incision has not been free enough for drainage, and when infection and swelling of the soft tissue of the eustachian canal block the way to the pharynx. Re-incision is indicated particularly when there is sagging of the wall of the external auditory canal, even if no other symptoms are present. Re-incision must be made if a tympanum shows the same condition that necessitated the primary operation, that is, pain, bulging and temperature.

Finally, there are cases where mastoid symptoms are present when the otologist and pediatrician will have to decide whether a re-incision of the tympanum should be done or the mastoid cells exenterated.

R. N. ANDREWS.

REMOVAL OF ADENOIDS IN INFANCY: Dr. Tod (The Practitioner, London, November, 1920). (Arch. of Ped., April, 1921.) The author states that when removing adenoids under the age of 6 months, especially if the baby be undersized, or ill-developed, a general anesthetic is neither required nor advisable. The infant is held in a sitting position by a nurse, a small curette is passed up behind the soft palate into the postnasal space and brought down with one sweep. Owing to the small size of the space, it requires but a tiny pad of adenoids to give rise to symptoms. As a rule, very little bleeding takes place, and there is little shock if the infant is kept warm. It is advisable not to feed for 3 hours before the operation.

The author has removed adenoids on infants as young as 3 weeks, and has observed no harmful results. On the contrary, immediate benefits were noted, and infants became stronger and better. He urges that adenoids be removed, no matter how young the infant, whenever they give rise to symptoms which may affect its immediate or future welfare.

R. N. ANDREWS.

ROENTGENOLOGY

SUPERVISORS:

C. U. DESJARDINS,

MAYO CLINIC, ROCHESTER

R. G. ALLISON,

SYNDICATE BLDG., MINNEAPOLIS

ROENTGEN RAY INTOXICATION—III: A study of Renal Function in Roentgen Ray Intoxication. Resistance of Renal Epithelium to Direct Radiation. Irvin McQuarrie, and G. H. Whipple. (Jour. of Exp. Med., Feb., 1922, p. 213.)

This paper deals with renal function and changes following exposures to Roentgen rays. Normal adult dogs, which had been observed for several days previous to the

experiment, and whose urine had previously been examined, were used in these experiments. A hard Coolidge tube was used, with 2 mm. aluminum as filter, and exposures of 25 cm. distance. Approximately 8 milliamperes were used in almost all experiments, the range being 5 to 10 milliamperes and 90 kilovolts, backed by a 9-inch spark gap. Exposures varied greatly, from lethal dose at a single exposure to moderate sublethal doses, over a period of time, with rest periods between exposures. Also, different regions of the body were exposed separately in different experiments. Renal function was studied by means of phenolsulphonephthalein test and urea elimination. Blood urea was determined at the same time.

Three groups of experiments were performed.

Group I. Group of sublethal exposures at intervals over a long period of time.

In this group there is no evidence of any cumulative effect of x-ray exposure, regardless of the amount of exposure given. Tabular results of four experiments are given in this group.

Group II. Group of lethal exposures over the abdomen with the kidneys and the rest of the body shielded.

In this group it was desired to study whether or not any toxic materials produced by radiation of the abdomen were carried to the kidney by the blood stream and there evidenced toxicity. Regardless of the severe intoxication and death in dogs of this group, there was no evidence of altered kidney function. While blood urea was increased to a degree, the urea ratio remained the same. In this group there was no evidence of the presence in the blood of nephrotoxic substances, even during severe intoxication. There are three tabular experimental reports for this group.

Group III. Group of enormous exposures of the kidneys, the remainder of the thorax and abdomen being shielded.

In this group of experiments there is a moderate depression of kidney function and a corresponding drop in the urea ratio, both probably due to the direct action of Roentgen rays on the kidney substance. There are six tabular experimental reports.

In all cases, histologically, nothing could be demonstrated; the kidneys of the radiated dogs were undistinguishable from those of the unirradiated.

From their work, the authors conclude that there is no danger of nephritis or kidney changes following x-ray exposure, and that the renal epithelium is more resistant to Roentgen rays than is that of the small intestine.

A. U. DESJARDINS.

ROENTGEN RAY INTOXICATION: Speed of Autolysis of Various Body Tissues of the Lethal X-ray Exposures: S. L. Warren and G. H. Whipple. (Jour. of Exp. Med., Feb., 1922, p. 225.)

By a simple method of autolysis very interesting information has been obtained regarding the rate of autolysis of different tissues of radiated and unirradiated dogs.

It was found in the radiated dogs that the rapidity of autolysis of the epithelium of the crypts of the small intestine was greatly increased, while in the same dog the epithelium of the villi was definitely slower in autolysis. However, in unirradiated dogs the epithelium of the villi

was autolysed first, while that of the crypts last. This was found to be constant at all stages up to death of the animal.

The lymphatic tissue, pancreas and liver of radiated dogs showed a slight increase in rate of autolysis, but in the stomach, colon and kidney there was little or no change.

After exposing the dogs to the action of Roentgen rays they were sacrificed by anesthesia at the end of 2, 24, 48, 72, and 96 hours. Sections were taken from various organs and fixed in 10 per cent formaldehyde, while other sections, approximately 3-5 gm. in weight, were taken from organs and placed, while warm, in bottles of warm 0.9 per cent sodium chloride previously saturated with excess of chloroform. These were then indubated at 37° C. and sections were cut at 4, 8, 10, 12, and 24 hour periods and fixed in 10 per cent formaldehyde. For controls, by a like procedure, autolysis was carried out in bottles prepared as above, except without chloroform, but with variable results, as in this instance putrefactive bacteria made inroads enough to obscure the true results. Further controls of organs of three unirradiated dogs were carried out under identical conditions.

This paper is illustrated with charts and tables of the various experiments performed.

A. U. DESJARDINS.

ROENTGEN RAY INTOXICATION—I: Unit Dose Over Thorax Negative. Over Abdomen Lethal. Epithelium of Small Intestine Sensitive to X-rays. S. L. Warren and G. H. Whipple. (Jour. of Exp. Med., Feb., 1922, p. 187.)

This paper reports a series of investigations concerning the systemic intoxication developing after certain exposures to large doses of hard Roentgen rays. X-ray reaction

is believed to be a true "non-specific intoxication," which is due to "primary injury of the epithelium of the small intestine," inasmuch as certain exposures over the thorax of a dog, whose abdomen was shielded, gave no apparent clinical manifestations, while the same exposure over the abdomen of the same dog, the thorax being shielded, produced a fatal intoxication.

Post-mortem examination revealed numerous areas of necrosis and atrophy with extensive disappearance of the epithelium of the villi and crypts in the small intestine, from the pylorus to the ileocecal junction, while the inflammatory reaction was not at all in proportion to the damage of the intestinal mucosa.

Radiation of the thorax, even in large amounts (300-512 milliamperes minutes) failed to produce clinical symptoms, only a slight temporary leukopenia and slight increase of the total nitrogen excretion being noted.

Radiation of the abdomen, with a unit thorax exposure, gave typical clinical manifestations, after a latent period of 24-36 hours; diarrhea, vomiting, weakness, prostration and death, usually occurred in four days. Inasmuch as there is more bone-marrow and lymphatic tissue involved in the radiation of the thorax than in that of the abdomen, and because the Peyer's patches of the small intestine gave evidence of very little change after radiation while the epithelium covering these follicles was either atrophied or absent, it was concluded that neither the bone-marrow nor the lymphatic tissue was responsible for the reaction following x-ray exposures.

For Sale—Good unopposed general practice in Southern Minnesota, in town of over 500 population. Collections good. Good roads. Office equipment, reasonable. All this is for sale. Reason for selling, going to specialize. Address B-37 % MINNESOTA MEDICINE.

ROSTER CORRECTIONS

In compiling the roster, printed in the May number of Minnesota Medicine, several errors were made. Correction of the mistakes, to which attention has been called, appear herewith. If there are any other members whose names were misspelled or whose address was wrongly given, they will confer a favor by advising, so that the official roster may be as accurate as it is possible to make it.

Goodhue County Medical Society

President
Alva Conley, M.D., Cannon Falls
(omitted from original roster)

Wabasha County Medical Society

Secretary
W. F. Wilson, M.D., Lake City
(omitted from original roster)

Le Sueur County Medical Society

L. F. Woodworth, M.D.,
.....Le Sueur Center
(erroneously printed in the original roster as L. F. Wentworth.)

St. Louis County Medical Society

L. M. Morsman, M.D., Hibbing
(erroneously printed in the original roster as C. F. Morsman.)

ALPHABETICAL ROSTER

The following members were omitted from the official roster as published in the May number of Minnesota Medicine.

J. D. Boyd, ...Caledonia
A. B. Eby, ...Spring Valley
C. N. Gunz, ...Center City
J. P. Freeman, ...Glenville

R. F. Nannestad, ...Lanesboro
Chas. F. Nootnagle, ...Minneapolis
H. P. Sawyer, ...Goodhue
M. W. Smith, ...Red Wing

ALPHABETICAL ROSTER

The following names of members were mis-spelled in the original roster as published in the May number of Minnesota Medicine.

Aylmer, A. L., ...Minneapolis
Archibald, F. M., ...Mahnomon
Baker, Glen L., ...Austin
Bolles, D. W., ...Galveston, Texas
Bass, Geo. W., ...Minneapolis
Busman, G. J., ...Rochester
Benepe, L. M., ...St. Paul
Benoit, Frank T., ...Minneapolis
Borreson, B., ...Benidji
Bouman, H. A., ...Minneapolis
Bowling, H. J., ...Rochester
Carlaw, C. M., ...Minneapolis
Clark, C. H., ...Galup, New Mexico
Cosman, E. O., ...Minneapolis
Crume, Geo. P., ...Minneapolis
Darrow, Daniel C., ...Moorhead
Eisenman, W. G., ...Chisholm
Ellison, Frank, ...Monticello
Folken, Frank G., ...Albert Lea
Frisch, Frank P., ...Gibbon
Gilbert, J. D., ...Carlton
Golberg, M. L., ...Jasper
Heath, A. C., ...St. Paul
Helland, G. M., ...Spring Grove
Hemstead, Werner, ...St. Cloud
Hertel, G. E., ...Austin
Hitchings, W. S., ...Lakefield
Hoidale, A. D., ...Tracy
Holcomb, J. T., ...St. Paul
House, Z. E., ...Cass Lake
Hielscher, Julian A., ...Mankato

Hursh, M. M., ...Grand Rapids
Joyce, T. M., ...Janesville
Kesting, Herman, ...St. Paul
Kelling, Louis F., ...Lakefield
Knauff, M. K., ...St. Paul
Knickerbocker, Frank H., ...Staples
Lewis, C. B., ...St. Cloud
Leibold, H. H., ...Parkers Prairie
Lillie, H. I., ...Rochester
Lynch, Matthew J., ...Minneapolis
McKibbin, Harry E., ...St. Cloud
Maland, Clarence O., ...Minneapolis
Maguire, Leo, ...Minneapolis
Mark, D. B., ...Minneapolis
Mvers, Thos., ...St. Paul
Morss, C. R., ...Zumbrota
Nelson, C. P., ...Owatonna
Osburn, Bert E., ...Internat'l Falls
Pelant, F. J., ...New Ulm
PHELPS, A. G., ...Ogilvie
Pierce, Chas. H., ...Wadena
Pineo, W. B., ...Minneapolis
Putney, Geo. E., ...Paynesville
Ransom, M. L., ...Hancock
Reed, Chas. A., ...Minneapolis
Reeves, C. E., ...Eagle Bend
Roberts, W. B., ...Minneapolis
Rowntree, L. G., ...Rochester
H. P. Sawyer, ...Goodhue
Scott, John W., ...St. Charles
Shannon, Wm. Ray, ...St. Paul
Shelden, W. D., ...Rochester
Strachauer, A. C., ...Minneapolis
Thissen, W. N., ...Faribault
Thomas, G. J., ...Minneapolis
Warham, T. T., ...Minneapolis
Willius, Frederick A., ...Rochester

It is suggested that this page be torn out and placed with the original Roster as published in the May issue of this Journal.

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ORIGINAL ARTICLES

SURGICAL TREATMENT OF GOITER

A. SCHWYZER, M.D.
St. Paul, Minn.

Discussion of the surgical treatment of goiter requires a separate consideration of different problems. The simple colloid and cystic goiters, the aberrant goiters (especially the intrathoracic forms), then the toxic forms and finally the malignant growths of the thyroid, each demand separate consideration.

In simple goiters the operative results have become so good that we are allowed to operate for cosmetic reasons alone, if the patient wishes it. A few points as to the technic may be worth while mentioning. First, the collar incision is sufficient for practically all cases. The four most important special features of the operation of thyroidectomy are: first, the hemostasis; second, injury to the recurrent laryngeal nerve; third, the occurrence of severe dyspnea from compression of the trachea; and fourth, the removal of too much glandular tissue.

As to hemostasis: In Switzerland, where the goiter surgery was early developed, a preliminary ligation of at least one inferior thyroid artery is almost universally done. This is due to the enormous size of many colloid goiters, as we very rarely see nowadays in this country. The *arteria thyroidea ima*, which at times is present, comes straight up from the chest accompanied often by large veins. It must always be thought of and looked out for. It may be as large as a lead pencil. In any difficult case the freeing of the upper horn is the greatest help to make us master of the situation. The laying bare of the trachea exposes the patient to the danger of severe bronchitis through the acute changes in the circulation with its consequent congestion. It also endangers somewhat the recurrent laryngeal nerve. This nerve may be paralyzed not only by cutting or removing a segment with the goiter, but the continuous suture may grasp it. The preliminary ligation of the inferior thyroid artery may injure it; or it may be overstretched by pulling

too strongly on the partly freed goiter lobe, or by pulling on the suture of the goiter stump.

When dealing with a very bloody and large goiter it is best for the less dexterous operator to cut between two clamps even after the principal recognizable blood vessels are clamped all around the lobe which is to be removed. A continuous suture (with catgut) of the remaining portion of the gland seems to have become generally preferred.

In a large intrathoracic goiter it is of prime importance to mobilize the accessible part and to free the upper horn as much as possible and to use it as a handle. It may become necessary to tear up with the finger the interior of the intrathoracic lobe, which may be too large for the bony rim of the entrance to the chest. A preliminary ligation of the inferior thyroid, if feasible, would be of great value here, but may be very difficult.

I have seen in a European clinic an intrathoracic goiter nearly the size of a new-born baby's head, in the right side of the chest. A preliminary splitting of the upper part of the sternum was performed. The patient died on the operating table from a wide opening of the pleural cavity.

We have, on repeated occasions, constructed very simple over-pressure apparatuses, which we improvised for such occasions, using ordinary bellows and any kind of an air chamber or rubber bag to equalize the intermittent action of the bellows. A gas-oxygen apparatus can also give this differential pressure which will keep the lungs filled though the pleuræ are opened. Both pleural sacs may become injured.

In intrathoracic goiters the third mentioned difficulty, the collapse of the trachea, is not infrequent. The only goiter case of the non-toxic type including the malignant forms that I have lost in 25 years' practice, was due to collapse of the trachea in an enormous colloid goiter. The patient left the table in pretty good condition, but became choked rather suddenly. In the great hurry that was necessary, we introduced a sterilized stomach tube through the mouth into the trachea down to the bifurcation. This restored the respiration, but a severe and profuse bronchoblenorrhoea followed; the intubation had to be repeated afterward and the patient weak-

ened out at the end of six days. Not long ago we had a case of severe choking from collapse of the trachea during the operation. A thread was put into each side of the trachea. The ends were brought out laterally from the flat neck muscles, and with a forceps attached were kept outside the dressings. The result was very satisfactory. In one severely stenosing intrathoracic goiter we had to do a tracheotomy first and inserted a long flexible cannula far down toward the bifurcation. After this the removal of the large goiter lobe could be done with comparative comfort.

As the fourth point to be watched for in operating for goiter we had mentioned the danger of removing too much tissue. If I may illustrate it again by some personal cases, we had, after removal of a large colloid goiter, a mild form of myxedema which showed itself by a gradual slight thickening of the nose in the course of a year, and a gradually coarser appearance of the face with some puffiness. This occurred though we left the whole posterior capsule with quite a respectable portion of the gland. The patient had apparently very little healthy thyroid tissue left. She had only a trace of reduced physical activity, and mentally no definite change could be made out. Thyroid feeding did her a great deal of good. Such an occurrence must be kept in mind when operating for colloid goiter, where in advanced cases the mental and physical torpidity tells you even before operation that the thyroid function is below par. Often the most degenerated portions of the thyroid are in the posterior layers, and then the only tissue left which looks reasonably normal is about the upper horns and maybe the isthmus. The tissue directly underneath the fibrous capsule is the most ready to take up the function in these cases, and therefore as much of this capsule as is well feasible should be preserved.

If the parathyroids are not normally developed, if they are missing on one side, etc., we are in danger of seeing a tetany develop by the complete removal of one side of the gland alone. Some tissue, if only a thin layer, ought therefore always to be left along the posterior capsule. Only in malignant cases are we allowed to remove one lobe completely and in such cases we have removed with the one side of the gland also the isthmus and the lower part of the other lobe without untoward result.

A case of tetany after thyroidectomy which I saw last year with the most typical symptoms, had been

given parathyroid feeding with only very little result. Calcium salts, added to this, had a very good result in less than twenty-four hours. The surgeon had undoubtedly been too radical. There was no trace of a thyroid to be made out.

In exophthalmic and all over-active (toxic) thyroids we are allowed to remove a great deal more of the gland than in a colloid goiter, up to five-sixths or even nine-tenths of the total glandular substance. Small remnants of the gland with the posterior capsule are apparently sufficient in these cases. There is no doubt but what in such extensive resections the effect of the operation is much more prompt and lasting.

If the patient is too toxic, if loss of weight occurred directly up to the time of the proposed surgical procedure, if the pulse is around 120 and shoots higher rapidly at any excitement, or, still worse, if it is irregular in rate and quality, if the restlessness and sleeplessness are outspoken, thyroidectomy is too dangerous at that moment and the ligation of one or both upper thyroid arteries is advisable as a preliminary step. I have had several cures lasting more than twenty years by ligating both superior arteries and one lower. One such case had, however, after twenty-four years of an apparently good cure again very severe Basedow symptoms and died promptly after thyroidectomy. If the basal metabolism is over +30, the toxic condition is marked, if over +50 it makes surgery risky, though the whole clinical picture will let you decide best whether you should wait with surgical intervention or whether ligation may be done of one or more arteries. Practical experience in judging the whole picture is here decisive, but Plummer's work in this field is nevertheless of greatest value and is truly classical.

Strumitis, with and without abscess formation, is a rare but important clinical picture. The septic symptoms may be very marked with high fever. If a central abscess is forming or one in the posterior layers, it is of great importance that the condition be recognized and treated promptly. Then you may be lucky enough (as a member of my family was) to get the inflamed lobe out clean and neat before a central abscess has burrowed perhaps backward with disastrous result. In other cases the infection may be much more mild. You see thyroiditis and strumitis more often in goiter countries than others, and with a word of Kocher, that always remained impressed on my mind, I will go over to a last chapter, the *malignant goiter*.

Kocher exclaimed once, "When will our Swiss physicians come to recognize that the onset of pain and growth in a goiter after middle age even with slight evening rises of the temperature, does not prove thyroiditis, but may just as well mean carcinoma of the thyroid?" The hardness and small nodular appearance with some stinging pain and increase in size of the gland ought to permit the diagnosis. In one patient, a male, 45 years old, we made the diagnosis of struma maligna and excised the thyroid extensively, though not totally, in November, 1913. The tumor was somewhat larger than a man's fist and was situated in the left lobe. All was well then for two years, when he began to notice a renewed swelling. He did, however, not come back until March, 1918, when I again found on the left side a fist-sized tumor and one of the size of a plum low down on the right side. The left tumor was not movable up and downward, and only very little sideways. We operated again, and had to resect the internal jugular vein for its whole length and two inches of the vagus nerve together with the tumor. About ten days after the operation we applied 3,700 milligramme-hours of radium and six months later another 2,500. During the year, 1919, he had radium twice again, which held the growth in check, though it had made its appearance again. The last time he came for radium treatment was in August, 1920. He was then in rather poor general condition.

Another case of an enormous carcinoma of the thyroid, over-reaching the sternum downward for 7 cm., could be only partly excised. This was done in January, 1918. Radium was used in maximal doses. In the first four months after the operation the 72-year-old lady gained from 118 to 176 pounds. Two years after the operation the neck was quite small and, though there was a hard induration around the trachea, the general condition was very acceptable. Six months later the patient died from what appeared to be pulmonary metastases.

It is noteworthy that some forms of carcinoma of the thyroid have a particular tendency to grow even at an early date into the thyroid veins and form there carcinomatous cords and thrombi. They can be felt and recognized at operation and are the cause of early metastases. These metastases appear comparatively frequently in bones at a time when the moderate swelling of the thyroid may not be recognized as a malignant growth and as the primary tumor.

THE TREATMENT OF EMPYEMA*

A. C. BAKER, M.D.

Fergus Falls, Minnesota

The word "empyema" is from the Greek, signifying a collection of pus in a cavity in whatsoever part of the body it may happen to be. It was generally used to mean a collection of suppurative matter in the testes, thorax, or abdomen. This is the sense in which the word was used by Hippocrates and others. In its most common and proper significance today it means pus in the thorax.

HISTORICAL REVIEW

The earliest known references to this condition are those of Hippocrates. His references to etiology, symptomatology, prognosis and treatment contained much that is fundamental to our present day conception. He said that patients affected with empyema following pleurisy recovered if they got clear of it in forty days from the time it ruptured, but if not, it passed into phthisis. He made further observation that if clear and white pus flowed when an empyema was opened either by cautery or an incision, the patient would recover, but if pus were mixed with blood and was stringy and fetid the patient died. His observations and procedures are truly remarkable when one considers that at this time nothing was known of percussion and auscultation and a diagnosis was made entirely from the symptoms and signs of a systemic infection, with the addition of cough and distress when lying on the sound side. An examination for fluid was made by shaking the patient by the shoulder and determining its presence and location by the splash.

Among those who wrote entertainingly and quite intelligently on the subject of empyema are: Euryphon, a contemporary of Hippocrates; Celsus, at the beginning of the Christian era; Leonidas, a Roman physician in the second century; Galen, in the second century; Aetius and Paulus Aegienta, two Greek physicians of the early middle ages; Albucasis, an Arab in the middle ages; and Fabricius, an Italian physician of the seventh century.

Fienus furnished the first article in German on paracentesis of the chest. The relative merits of opening, whether by cautery or bistoury, were considered and it was stated that the most likely location for opening an empyema was between the sec-

*Presented before the Southern Minnesota Medical Association, Mankato, December, 1921.

ond and third ribs from below, bearing in mind the necessity of care in avoiding injury to the diaphragm. The writers through the eighteenth century dealt largely with a repetition of the facts already stated with a citation of numerous cases and quite frequently with the post-mortem findings. While the ancients undoubtedly operated on cases of empyema, from the time of Hippocrates on, the operation was largely confined to those cases which pointed in the chest wall.

Practically no advance was made from the time of Hippocrates up to 1761, when Auenbrugger described the art of percussion of the thorax. His contemporaries did not recognize its merits and several decades elapsed before it was appreciated. In the literature discord prevails during most of the nineteenth century regarding the treatment of empyema. In 1834 Faure reported before the Academy of Medicine in Paris eight cases operated, two of whom got well, and the remaining six much improved. This provoked much discussion as the operative method was then held in much disfavor. Mercury, purging, bleeding, blistering, and hot fomentations, combined with diet, seemed to be the medical treatment of choice. Laennec, in 1818, stated the operation for empyema was rarely successful. Dupuytren treated fifty cases, only four being cured, and when he developed empyema he refused operation, preferring to die by the hand of God, rather than being helped by a surgeon. Practically all cases reported at this time were "empyema necessitas." Syringes, cannulae and aspirating devices were in general disfavor, as it seemed that with their use in acute empyemas the probability of a development of pneumothorax was great and the probability of cure, small.

In 1860, Aupepin described a new technique for performing thoracotomy, making the opening in the skin and that through the muscle at a different level, thus producing a sort of valve-like action and thereby preventing pneumothorax.

In 1881, Homen collected a series of 141 cases, treated by various surgeons by incision and irrigation, 33 per cent of whom died.

In 1860, Walter reported the resection of a piece of rib for drainage in chronic empyema. Billroth, Koenig, and Ewald then began to perform this operation in their clinics. Simon, in 1869, recommended rib resection in order to reduce a chronic empyema. Kuster in 1877 recommends the same procedure, but it is to Estlander

that credit is generally given for the principle of rib resection for the obliteration of chronic empyema cavities. In 1879 he reported six cases, recommending that a sufficient number of ribs be resected to completely unroof the cavity. Various modifications of this procedure were practiced by different operators from this time on.

In 1890, Schede described his operation, which consisted in turning up a flap of skin and muscle larger than the cavity, then resecting the entire chest wall beneath, the flap being allowed to fall against the collapsed lung; he reported ten cases with two deaths. From 1860 to 1890 the whole trend of the surgeon was towards devising methods to bring the chest wall down to the collapsed lung.

In 1892, Delorme enunciated a new principle in the treatment of this condition, namely: that of the obliteration of the cavity with re-expansion of the lung. This method had been foreshadowed by the literature of that time which at various times and places stated that sometimes cavities were reduced by insufflation, and opinions were expressed that the lung itself probably was capable of re-expansion if not prevented by a limiting membrane. In 1892 Delorme dissected off the parietal pleura in a small empyema cavity with cure; and he thus obtained his idea and reported his procedures. Fowler performed the first operation in 1893. To Delorme, then, belongs the credit of having first enunciated the principle, and to Fowler the credit of having first successfully performed the operation for bringing a collapsed lung out to the chest wall. No contraindication was recognized except that for any surgical procedure; proposed modifications have been numerous, among the most important being rib spreading to conserve the chest wall, insufflation to aid expansion, making gridiron incisions in the thickened pleura when it was found impossible to dissect the membrane from the lung; suturing the lung to the parietal pleura if the lung failed to expand after decortication.

Robinson, of the Mayo Clinic, made use of the muscles of the thoracic wall in filling the empyema cavity. Beck obtained good results by the use of his skin-sliding operation after excision of the roof of the cavity, and in 150 cases of chronic empyema reported 80 per cent cures with his bismuth paste.

PROCEDURES IN ACUTE EMPYEMA

In the development of acute empyema it may properly be asked what constitutes pus. It is usu-

ally true that a serous exudate such as we usually find early in these cases gradually becomes a creamy thick substance designated as pus. Beck has laid down an arbitrary rule stating that if 10 c.c. of this fluid is withdrawn it will be noted that the amount of sediment and purulent matter settling at the bottom will be greater each day. If the fluid withdrawn contains more than 20 per cent of sediment after standing for twenty-four hours it should be considered true pus.

Physiological Considerations.—The presence of an intrapleural pressure less than atmospheric and the reason thereof is a physiological fact well known to all. The collapse of a lung due to equalization pressure within and without, if the chest is open, is another well known fact.

Other factors which deserve first consideration in every clinical application in the surgery of the chest, are:

1. The relationship between the opening in the chest wall and the size of the glottis. Graham and Bell demonstrated the great importance of this in the treatment of acute empyema, showing that the pleural cavities react as one, due to the mobility of the mediastinum, and that when the pressure was large on one side it was correspondingly large on the other. Knowing these facts we should be able to treat a case of bilateral empyema as intelligently as we treat a unilateral case.

2. The mobility of the mediastinum.

3. The presence or absence of adhesions.

4. The vital capacity of the patient. Graham showed that the absolute size of the opening in the chest, in comparison with the glottis, depended on the vital capacity of the patient at that time.

These factors, which are subject to great variance in different individuals, may easily account for the different opinions and conclusions of various clinicians and experimenters in the treatment of acute empyema.

In the treatment of acute empyema we must try to be sure that there is not an existing acute lung involvement. During the influenza epidemic these cases developed so rapidly that the severity of the symptoms seemed to be due entirely to an acute empyema, when many times an acute localized pneumonia existed. We must make sure of this point, for undoubtedly many deaths may be accounted for by the fact that many an operation for an acute empyema is really an operation upon an

acute pneumonia. From our own experience and knowledge gleaned from the available literature, it has been concluded that, except for a tuberculous infection, there seems to be no clear relationship between the type of infection and the severity of progress of either an acute or a chronic empyema.

In acute empyema we have found it best to start by aspirating. This does two things: (1) diminishes pressure; (2) diminishes the amount of absorption. If progress is favorable we may aspirate daily for five to ten days. With this treatment there is no question but that a few cases entirely clear up. If progress is not satisfactory we insert a tube through a hollow cannula between the ribs at the most dependent portion, employing suction to remove shreds and clots if necessary, keeping the tube clamped between emptying intervals, using great care to prevent pneumothorax, which prolongs every case and in a certain percentage of cases is the entire cause of the chronic condition. To flush or not to flush is a mooted question. To us it has seemed that we obtained our best results by not flushing or, at most, only sufficiently to remove whatever plugged the tube. We have secured quite a number of cures in pursuing this method alone. If, in a reasonable time, progress is not made, usually as a result of inadequate drainage, we make a rib resection at the most dependent portion; however, by this time, adhesions have usually taken place and we do not fear an acute pneumothorax. During the drainage period we supplement this with the use of Wolff's bottles and in the case of children with the inflation of toy balloons.

CHRONIC EMPYEMA

In chronic empyema a large opening may be made into the pleural cavity without respiratory embarrassment as the pleural cavities on either side function independently, because of the fixation of the mediastinum and pulmonary adhesions. In the treatment of chronic empyema we must have a clear conception of the cause and pathology. Chronic cavities and persistent fistulas are usually different phases of the same condition; the most common cause of the latter are chronic cavities, osteomyelitis of the rib, broncho-cutaneous fistulas, fibrosis of the sinus wall, foreign bodies and tuberculosis; most causes of chronic cavities are pneumothorax, inadequate drainage, foreign bodies, reinfection and tuberculosis. While empyema has been recognized for twenty-six hundred years, it

was only sixty years ago that the first rib resection was performed; the first thirty years of this period show the development of the idea and the perfection of technique as developed by Schede in bringing the chest down to the contracted lung; the last thirty years has tended more and more to conservatism as first illustrated by the ideas proposed and executed by Delorme and Fowler in bringing the lung out to the chest wall.

Lung expansion has been variously explained. Roser held it was brought about by means of adhesions whose progressive growth along the cavity margin pulled the lung out. Wussgarber held that during expiration intratracheal pressure is increased resulting in lung expansion. That there is truth in both assertions is attested by the various devices used to facilitate the former and the clinical evidence of the value of the latter. Snyder*, of Rochester, has described a procedure which combines the principles of the two: a suction apparatus tends to hold out the lung so that adhesions may form; in addition to this, blowing into Wolff's bottles increases intratracheal pressure and with it lung expansion. As has been before stated, the guiding principles of the last thirty years have been towards conservatism and these principles must be adhered to since persistent fistulas and chronic cavities are not necessarily inconsistent with long life and a fair degree of efficiency. In caring for these chronic cases we must be guided by the pathology present. This must first be determined as accurately as possible, making use of all the diagnostic aids at our command.

Foreign bodies and osteomyelitis of the ribs having been ruled out, most cases persist because of inadequate drainage. We should endeavor to ascertain the size and extent of the cavity; then adequate drainage, which usually means drainage at the most dependent point, must be obtained. Having accomplished this, most cavities persist because of a pneumothorax or the existing infection which may be secondary, or a combination of the two. These cavities should then be irrigated with Dakin's hypochlorite solution every two hours, measurement being made from time to time. This accomplishes several things:

1. The cavity is gradually but surely sterilized, thus relieving the system of toxins, and the general condition of the patient is greatly improved.
2. The thickened membrane covering the lung

is softened, often sufficient to permit lung expansion.

3. The size of the cavity is reduced so that in case a cure is not effected a plastic operation of much less degree may accomplish the result.

4. It promotes the growth of healthy granulations which facilitates formation of adhesions between the lung and chest wall.

5. The sterilization of the cavity greatly reduces the risk attending any operation.

6. Irrigation with Dakin's hypochlorite solution is contraindicated in cavities with bronchial fistulas; here, irrigation with normal salt solution should be used.

Cavities with bronchial fistulas will not close until the fistulas are closed. Frequently a fistula will close as the result of the irrigation treatment. Beck reports the closure of many cases of bronchial fistulas by treating the cavity with bismuth paste. In case this is not successful, eventually some plastic operation must be done and at that time the fistula generally may be closed with cautery.

The surgical treatment of tuberculous empyema is notoriously unsatisfactory; unless the accumulation is so great that pressure symptoms must be considered or it has seemed to us that the condition had better be left alone, as secondary infection may occur either from within or without. Kalb¹ recommends that where they must be dealt with that they should be aspirated and all the fluid in the cavity withdrawn. Then, Murphy's method of infecting from two to twelve ounces of two per cent formaldehyde in glycerine should be used, injecting an amount equal to half the amount withdrawn. Air is then introduced until the manometer reading is near the negative point, or, if it is a case of artificial pneumothorax, the pressure is raised to that usually given this patient. In from two to seven days the patient is again aspirated and again injected with the formaldehyde solution. This is continued every three to ten days until the character of the fluid becomes sero-sanguinous, when it is sterile, and harmless. A tuberculous empyema already opened should be treated according to the rules already established with the addition of the usual systemic treatment for any one affected with tuberculosis.

CONCLUSIONS

1. Acute empyema is best treated: (1) by aspiration; (2) by catheter drainage, being careful to prevent pneumothorax; (3) by rib resection. By

*Snyder, John: A suction apparatus for the treatment of empyema. *Surg., Gyn. & Obs.*, Nov., 1921.

¹Kalb, G. B.: Tuberculous Empyema. *Am. Rev. Tuberculosis*, June, 1921.

the time this is requisite, adhesions have usually minimized the dangers of an acute pneumothorax.

2. After a period of approximately three months, if a cure is not effected, the case should properly be considered chronic and should be treated accordingly. Certain types are chronic from the beginning in the sense that they do not heal with simply adequate drainage; here the irrigation with Dakin's hypochlorite solution is the treatment of choice for the reasons previously enumerated.

3. For the cavity which does not now become obliterated, a pulmonary decortication through the rib-spreading exposure after a preliminary irrigation treatment is the most conservative procedure.

4. If we were then successful a plastic operation is indicated.

5. Tuberculous empyema, not secondarily infected, should not be drained and should be aspirated only for a considerable accumulation of fluid. A large cavity may persist in these cases for years without any effort at lung expansion. It has been found that the pleura is not much thickened, and here probably a fibrosis of the lung has occurred which may also occur in old pyogenic empyema where the lung has lost its power of expansion.

6. The closure of bronchial fistulas is a requisite to healing.

7. Bronchial fistulas are the only contraindications to irrigation with Dakin's hypochlorite solution; here a normal salt solution shall be used until such a time as the closure of the fistula has been secured.

8. Most sinuses close eventually after the obliteration of chronic cavities. Those that do not, require treatment by some plastic operation.

9. Preliminary sterilization reduces infection, amount of shock, extent of operation and consequently the mortality and in very many cases removes the necessity of any operation whatsoever.

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DISCUSSION

DR. CARL A. HEDBLUM, Rochester: We are to be congratulated on having had the opportunity to hear such an instructive paper on the subject of the treatment of empyema. The historical review brought out the striking paradox that although empyema has been operated on since the time of the ancients, it is only within the last sixty years that the first step was taken toward placing the surgical treatment on a rational basis. It was in 1860 that Walter, an American, first resected a normal rib for drainage of empyema.

Doctor Baker very properly raised the question of what constitutes a purulent pleural effusion. Given a turbid or seropurulent fluid, it may be very difficult to decide whether or not the case is to be considered one of empyema. The guiding principle should be, first the condition of the patient and second the microscopic and cultural findings in the fluid. If the patient presents the general picture of an acute infection, the case may often be considered at least as potentially one of empyema; while if the clinical picture is not that of an acute infection the case may be properly considered for the time being as not one of purulent pleurisy. For purposes of treatment it is also very important to bear in mind the possibility of tuberculous empyema. Any case of empyema which has its beginning as pleurisy with serous effusion, the fluid gradually becoming purulent is probably tuberculous and, unless the clinical picture is definitely that of sepsis, should never be drained except in cases where the culture shows a pyogenic infection.

In the treatment of chronic empyema the guiding principle should be conservatism. The patient's life is usually not at stake and for this reason an immediate radical operation is not necessary. Securing adequate drainage is the first consideration and doing away with the slow toxic absorption by irritation of the cavity is also important. Often a large cavity may be entirely obliterated by irrigation with Dakin's solution. The patient often shows a most remarkable improvement under this method of treatment.

If the cavity is only partly obliterated and is still of considerable size, pulmonary decortication may be resorted to. If the cavity is small a plastic operation should be performed. If the cavity is large and decortication fails, then a radical operation is indicated. I believe that decor-

tication should not be attempted for obliteration of a tuberculous empyema cavity.

One word on the use of Dakin's solution. Care should be taken that the solution contains the proper amount of chlorine. If it does not, it is not Dakin's solution. Caution should be exercised in the use of so-called Dakin's solution or any proprietary hypochlorite solution to make sure that it has the proper chlorine strength.

DR. A. W. IDE, St. Paul: I was sorry Dr. Baker did not have time to complete his paper. I was interested in it, and he has brought out everything up to date.

The diagnosis of empyema is not always easy to make. I recall a case that came under my observation not long ago which shows that these cases may develop rather slowly and the quantity of fluid may be small in amount at first, but one can hardly see any good reason for missing the diagnosis of empyema with the physical findings, the x-ray, and exploratory puncture.

I was taught early in my career the value of the needle by Dr. George Dock who resorted to this method in making the diagnosis. The improvement in the treatment of empyema has been very remarkable in comparatively few years. Looking back fifteen years we can all remember cases that had had mutilating operations done. These operations with our present knowledge seem entirely unnecessary and unwarranted.

The doctor brought out quite hurriedly the question of the Dakin treatment in chronic cases which undoubtedly releases the lung and increases the expansion of the lung to a great extent.

The question of anesthesia is important. Unquestionably a great amount of this work can be done under local anesthesia. Intratracheal anesthesia is also helpful, but for ordinary purposes local anesthesia is all that is necessary.

Graham has made a great contribution to our knowledge in this matter. In his recent article he calls attention to the physiology of the chest and to the fact that septum between the two lungs (mediastinum) is not rigid. This is particularly so in the acute cases.

DR. E. Z. WANOUS, Minneapolis: I would like to call attention to the treatment of remote focal infections in the management of these cases. I recall a case that came under my observation sometime ago that had a large effusion. The patient was examined very carefully, and we found the source of infection in two infected teeth. The case cleared up entirely after the removal of these teeth. I call attention to this because so many times we look for the source of infection in the pleural cavity itself when it may be found elsewhere.

DR. HARRY P. RITCHIE, St. Paul: I was interested to note that Dr. Baker said the ancients recommended that these cavities, when drainage was necessary, be made between the second and third ribs below. The principle of dependent and constant drainage is a fundamental one in the treatment of these cases. It should be instituted as soon as it is safe to do so and all other procedures are entirely subsidiary to this method.

DR. A. C. BAKER, Fergus Falls (closing): This subject is important to all of us because the average practitioner comes up against them frequently, and I want to leave this idea with you, that every case of empyema should be treated

first by aspiration. Many cases are cured that way alone. If this does not cure, catheter drainage should be used and a large percentage cured that way. If you must resect a rib or ribs, try to avoid breaking up adhesions so that an acute pneumothorax will not occur.

I am sorry the treatment of tubercular empyema could not be gone into more thoroughly and at greater length. Cabot, in the *Annals of Tuberculosis*, recommends when the fluid is so great that pressure interferes with other organs or secondary infection takes place that the fluid should be aspirated and, in a way, partially follows Murphy's technic, of injecting a solution of one-half per cent formalin in glycerin, injecting an amount equal to half the amount which was withdrawn, repeating this process in from three to ten days, injecting half as much as you withdraw. He states that after two or three repetitions of this procedure you will render the fluid absolutely sterile, and when it becomes sterile it may be left alone.

Too much emphasis cannot be placed on what Dr. Hedblom has brought out in the treatment of empyema cavities with the Carrel-Dakin solution. The condition has been reduced from a very serious one to a relatively simple one which can be handled by most anybody. We are not justified in doing radical things to reduce convalescence when we can by simple procedures carry these patients along, when many of them live their natural lifetimes and carry their empyema with them. Many of them can be cured by the simple procedure of adequate irrigation, and if you do not cure them you reduce them to a condition which can be operated on easily. Most of these cases can be operated on under local anesthesia.

THYROID THERAPY*

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The x-ray treatment of hyperthyroidism is one of the newer contributions of medicine. The reviews concerning the technique and dosage and the extent and duration of results have in most cases not been complete. We should like to report 35 cases from our private and dispensary clientele observed from January, 1920, to the present time and on whom roentgen treatment was completed before February, 1921.

As concerning the older literature, we will review it briefly: We wish to mention in the German literature, Stegmann, 1905, Eiselberg, 1909, Rave, 1911, and Nagelschmidt, 1912; from the Scandinavian literature, Forsell, 1914, Fischer, 1916, and recently, Nordentoft, 1921; in this country the earlier reports of Williams, 1902, Mayo, 1904, Beck, 1905, and Pfahler and Zulick, 1910. The last article in the American literature is by Means and Aub, 1919,

*Presented before the Southern Minnesota Medical Association, Mankato, December, 1921.

whose excellent work reopened the *x*-ray treatment of the disease in this country.

The material includes cases of hyperthyroidism which came under the observation of the medical service at the University Hospital, dispensary and private practice during a period of approximately twenty months. No attempt of selection of cases has been made, beyond excluding a few cases in which we could not obtain the necessary co-operation from the referring physicians. The series does not include cases admitted to the surgical service, some of which were more toxic and in which surgical treatment was immediately resorted to. For better interpretation of data the cases have been divided into three groups.

The first group consists of cases of toxic goiter with and without exophthalmos varying from mild to severe.

The second group consists of six post-operative cases of exophthalmic goiter and is included because it represents those cases in which medical treatment is instituted only because surgical treatment has already eliminated itself.

The third group included three cases of thyrotoxic adenoma which received *x*-ray treatment and are reported for whatever value they may have. No attempt has been made to increase the number of this type of case.

The individuals in these series for the most part led their usual lives and no other coincident treatment was carried on. A few of the cases were under hospital treatment for a few weeks but they form a relatively small part of the series. Most of the observations have been made at the office and the dispensary. Estimation of the activity of the thyroid gland has been based on the metabolic rate, clinical signs and symptoms, such as pulse rate, character of the gland, eye signs, tremor and nervousness. Such data has been incomplete in some of the cases, but in all instances has been sufficient to enable conclusions to be drawn as to the results of treatment. The determination of the metabolic rate has been attempted in each case once every three weeks corresponding numerically to the *x*-ray treatments, and, in order to avoid an immediate increase that might follow during the first few days, usually eight to ten days following exposure. In some patients fewer determinations were possible, but in all cases the last metabolic rate has been recorded and checked from three to six weeks after the last treatment. The gasometer method of determining the metabolic rate has been employed.

Tissot's spirometer has been used for the collection of the air, and for its analysis the Haldane apparatus. Care has been taken to have the patient in the post-absorptive stage, that is twelve to fourteen hours after food intake, with sufficient period of rest before each determination.

TECHNIC

These cases were all treated with a standard dosage at three-week intervals. The radiation consisted of 30 milliamperes-minutes of ray filtered through 4 mm. of aluminum and one thickness of sole leather. The target-skin distance was 8 inches and the voltage was equal to an 8-inch spark-gap measured between blunt points. Three portals of entry were used, one over each lobe of the thyroid and one over the thymus. If there was not marked improvement noted at the completion of the fourth treatment the dosage was increased to 34 milliamperes-minutes, the other factors remaining constant. It is worthy of note that in several of the cases where improvement has been tardy, a rapid improvement, both in metabolic rate and in the general well-being of the patient was coincident with increased dosage. This is of interest in that most of the European roentgenologists have insisted on large doses at long intervals. While it has been difficult to interpret their induction coil and gas tube technic in terms of interrupterless transformer and the Collidge tube, the constant reiteration through their articles that small doses stimulate and large doses inhibit thyroid activity, is worthy of note. We furthermore believe that there is much less risk of a cumulative skin reaction developing if treatments are given not oftener than once in three weeks.

It must be emphasized that the closest co-operation possible between the referring physician and the roentgen therapist is necessary. A clear understanding is essential as to which assumes the responsibility for the clinical observation and the metabolic readings upon the patient. Otherwise intercurrent infections may be overlooked or over-treatment may result.

DISCUSSION

Group 1 consists of cases of toxic goiter including all degrees of activity, the average case being one of moderate severity as evidenced by a mean metabolic rate of plus 33 per cent. Clinically the same estimation is possibly evidenced by the fact that most of the group were ambulatory patients. We have not attempted to gauge clinical improvement between various treatments. However, a summa-

tion of clinical results is possible following the series of treatments, both as to the patients' condition subjectively and objectively. The pulse rate has been diminished, tremor and nervous symptoms, including insomnia, have been less marked. As would be expected there has been no marked alteration in the eye signs and character of the gland, except in Case 10 in which a markedly enlarged and indurated gland disappeared as if by magic with correspondingly subjective improvement. Fall in heat production followed two exposures to *x-ray* and the indurated character of the gland and the subsequent course suggest an acute thyroiditis.

Two cases received no appreciable benefit as indicated by lack of clinical improvement and heat production. One of these, Case 17, was a boy of 14, with a diffusely enlarged vascular gland and marked exophthalmos. Operation was later resorted to with subsequent clinical improvement and fall in metabolic rate to minus 17 per cent. Four months later the basal metabolism had again returned to plus 4 per cent. Case 18, a woman of twenty-six years of age, with diffusely enlarged vascular gland but no exophthalmos showed very little response after three treatments and was later operated. For accuracy, it should be stated that Case 2 responded to *x-ray* therapy only after the removal of badly infected tonsils, which undoubtedly had some etiological relationship to her hyperthyroidism.

Recently we have had an interesting (incomplete) case. A girl with symptoms of hyperthyroidism without exophthalmos, showed an increased basal rate of plus 65 per cent. This type of case has generally been given to the surgical service, but it was agreed because of the severity of the nervous manifestation to try rest in bed and *x-ray* therapy first. Two weeks after her first *x-ray* treatment her rate had fallen to plus 25 per cent and the pulse had decreased. Three weeks following her second treatment the basal metabolic rate had dropped to plus 18 per cent. This case received from the first 34 milliampere-minutes of radiation. This case has not been completed and is discussed to show the results of more intensive therapy.

Group 2 consists of six cases which had partial thyroidectomy but in whom hyperthyroidism was present. In Case 3 of this group the improvement has been sufficient to enable the patient to resume work. In the other five cases the improvement has not been as marked as the decrease in metabolic rate from plus 27 per cent to 13 per cent after

therapy would indicate. The subjective symptoms have showed little or no improvement.

Group 3 measured both clinically and my basal metabolic rate shows no response to *x-ray* therapy, conforming quite generally to accepted idea in cases of toxic adenoma. The average basal rate before treatment was plus 29 per cent and afterward was plus 28 per cent.

DISCUSSION IN GENERAL

We wish to mention a few cases that are incomplete and are not included in our series of 35 cases. A woman of 27 was operated recently after being under incomplete observation for a period of a year. She had had four treatments during the last ten months usually with intervals of from two to three months. At the beginning her basal rate was plus 35 per cent. Two months ago on entrance to the hospital she had a rate of plus 13 per cent. The patient wished an operation solely because of the enlargement of the thyroid. Subjectively her symptoms had disappeared and objectively exophthalmos and enlargement of the neck were the only remaining signs of hyperthyroidism. On consultation the surgeon felt that she might possibly have an adenoma in the region of the isthmus, and thought for that reason operation was indicated. At operation she was found to have only an enlarged goiter of the hyperplastic type. The surgeon states that the operation was not more difficult than on the usual untreated thyroid. This is in direct accord with Porter's observation in Boston in correlation with Means' and Aub's work. Rave, from the European side, also states that he can find no greater difficulty in the removal of thyroids which have been subjected to *x-ray* therapy than in untreated cases. To return to Case 17, mentioned above, which did not respond to *x-ray* therapy, it was found at operation that the gland was somewhat more difficult to remove than in the usual case.

One other case, which is incomplete, is to be mentioned. A young girl, aged 20, entered the hospital with a basal metabolic rate of plus 65 per cent and was given preliminary *x-ray* treatment and put to bed. Two weeks later the basal rate was 45 per cent with a corresponding clinical improvement. An acute tonsillitis with peritonsillar abscess developed at this time and for several weeks *x-ray* treatment was discontinued. After removal of the tonsils under local anesthesia her basal metabolism was found to be plus 80 per cent. At this time she insisted on returning home and two weeks later was operated upon at another hospital, dying dur-

ing the operation. This case is mentioned because we felt that her increasing rate made surgery inadvisable at that time. As is stated by Means and Aub in their work of 1919, "A progressively increasing basal rate is a contra indication to operation."

Another case which left the hospital against advice immediately following the first x -ray treatment died two and a half weeks later apparently from an acute thyro-toxicosis. He entered the hospital markedly febrile, with extremely fast pulse, tremor and exophthalmos. His basal rate on entrance was plus 80 per cent. After six weeks' rest in bed he showed no improvement except for a fall in his basal metabolic rate to plus 54 per cent. An x -ray treatment was administered at this time and on the following day the patient insisted on returning home. A communication from his physician states that he died two and a half weeks after from hyperthyroidism. All other cases have been checked and we now know the condition of the patients in this series at this time. Not one has had a relapse.

Improvement as a rule begins about two weeks after the first treatment; first as a marked subjective response, later as an improvement in the objective findings. The earliest symptoms to disappear are usually tremor, nervousness, insomnia and subjective cardiac disturbances, the latter even if the pulse rate is not materially diminished. In the more severe cases improvement usually comes about more slowly and is first noticeable after the second and third treatments.

In all of the cases, improvement has continued for many months after the last x -ray treatment. This improvement is at a time when the basal rate is nearly normal, the basal rate being used at this time only as a mathematical check upon our patients. We have not attempted at any time to get a minus rate, thereby removing the probability of myxedema occurring. There are two cases in the series where the gland has gradually decreased in size. Exophthalmos has decreased in a few, but in none, at this early date, has it disappeared. Tachycardia has been usually the last symptom to show improvement, and, as must be emphasized, most patients have for a long time retained a tendency to an unstable pulse during periods of unusual stress. This experience is in accord with those treated surgically; improvement is often slow and is only complete after months, or even years.

It is known that in severe cases of Basedow's

disease enlargement of the thymus is frequently found. Cappele and Bayer have reported a few such cases where the thyroid was nearly normal in size, and where after thymus removal symptoms have disappeared. Nordentoft reports numerous cases where only after radiation of the thymus as well as the thyroid was improvement noted. Also he reports a few cases where radiation over the thymus alone gave marked improvement but not a complete cure. This may account for some of the early failures in the x -ray treatment of this disease as formerly most roentgen therapists did not include the thymus in the area treated. The routine inclusion of the thymus may account in some degree at least for the better and more lasting results obtained today.

SUMMARY

1. Of twenty-seven cases of Graves' disease without complications who were subjected to x -ray treatment, but were not operated, twenty-four are well, both from the clinical and laboratory standpoint. The treatment has been complete for nearly eight months. The remaining three cases came to operation. Of these three, one, we feel, was definitely improved before operation and the other two were normal a few months after operation. Of six cases of postoperative hyperthyroidism, which had relapsed, one showed a definite cure. The other five showed no improvement. Of three cases of thyrotoxic adenoma none showed any response to x -ray therapy.

2. The only case of our series which was operated during an increasing basal metabolic rate died an operative death.

3. We feel that the results obtained in the earlier cases might have been attained more quickly if more intensive therapy had been used.

4. No bad results or complications, which we could attribute to the treatments, have occurred in any of our series.

5. From our experience with this treatment we are firmly convinced that, only with the closest possible co-operation between the clinical and roentgen therapist, can satisfactory results be obtained.

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DISCUSSION

DR. W. E. SISTRUNK, Rochester: Dr. Allison's paper is a very interesting one because he has taken up a subject which is being discussed very generally over the country.

In Rochester for many years we have used x-ray as an adjunct in the treatment of exophthalmic goiter, but we have never felt that a great deal of benefit was to be derived from it. A year or two ago, after x-ray exposures were advocated, we treated certain patients with large doses of x-ray. We probably began the wrong way, as we used the treatment in the bad cases, those in which the metabolic rate was high, from 65 to 90 per cent above normal. From all I am able to learn from conversing with men who are doing this work, these are the cases which respond slowly to x-ray treatment and we were disappointed in the results. Although we got a drop in the metabolic rate and could see improvement in some of the patients treated with x-ray, the patients under ordinary medical treatment usually improve, and for that reason we never become enthusiastic in regard to the x-ray treatment.

Had we started with milder cases perhaps we would have been much more favorably impressed, because I understand the mild form of the disease is much more likely to respond to x-ray treatment.

We get excellent results from operation and as the risk is small, we have preferred this means of treatment. We prefer to operate early in the course of the disease before marked degenerative changes have occurred in the heart, liver, kidneys and other organs. After these changes have occurred the results from operation are not so satisfactory. We can stop the hyperthyroidism and bring the metabolic rate to normal but the degenerative changes persist, and such patients cannot be brought to normal by operation.

I had the opportunity last week while in Boston of hearing this subject discussed on two different occasions at a meeting of the Society of Clinical Surgery. Doctors Holmes and Porter of the Massachusetts General Hospital showed cases of goiter treated with x-ray and other methods. From their discussion I was led to believe that marked improvement was obtained in the cases of early hyperthyroidism. The patients with high metabolic rates did not improve so satisfactorily under treatment. True exophthalmic goitre responded better to treatment than did the toxic adenomas. They felt that better results were obtained with x-ray than by ligation, but that the best results followed subtotal thyroidectomy. When patients failed to respond to x-ray treatment they resorted to thyroidectomy with benefit to the patient.

Dr. Cheever presented four cases. In two of these patients he had used the x-ray for periods of three or four months, with some improvement, but not a cure. These same patients were then ligated with considerable benefit. In two other patients he ligated both superior poles and the inferior vessels on one side and used x-ray. An immediate drop in the metabolic rate occurred. He was unable to explain this rapid drop.

Improvement following the use of x-ray is slow in manifesting itself and this is one of the reasons we have hesitated to use this form of treatment. We feel that when a patient has an active exophthalmic goitre it is necessary to remove this as soon as possible in order to prevent the degenerative changes in the vital organs which are almost certain to occur while it is present.

I feel that Dr. Allison has presented a very timely paper, and I feel quite sure that x-ray is going to be an aid in the treatment of hyperthyroidism.

DR. R. I. RIZER, Minneapolis: We have been much interested in this work and have had the opportunity of seeing some of Dr. Allison's cases. There are several points that need accentuation, one of which is the fact that these cases must be correlated with repeated basal metabolism tests, and unless this is done, one has no way of telling what he is accomplishing. One author reports that he has produced myxedema, and these were cases treated for a long time, one of his cases for eight years, but he did not check the metabolic readings, and since that time by checking his work with metabolic readings he has produced no myxedema.

Another system we have used is to have metabolic readings, about seven to ten, following each treatment, and afterwards to keep them under control for a period of time. Some of the associated symptoms, like tachycardia in the acute cases, will thereby go down correspondingly with the metabolic rate declining; the weight at the same time will go up. In the old chronic cases, where you have true myocarditis, one need not expect to have lowering of the pulse rate with a dropping of the metabolic rate, because you are dealing with a true myocardial lesion, and that will take time and rest in bed, so that following the thyroid care one needs to take care of other conditions in association with it or accompanying it.

Another point is the treatment. Dr. Allison brought out three points, leaving the isthmus or area over the larynx alone because painful, distressing dysphonia has occurred. At other points it leaves an area where the hard rays do not strike it, but they can be hit, and after it is struck it may produce myxedema. By leaving the isthmus one insures against producing a myxedematous condition in the early stages. The small doses will stimulate, but the larger doses will probably cause the gland to atrophy and give the required results with a drop in metabolism.

DR. M. J. KERN, St. Cloud: I would like to bring up one question in regard to the time reading of the metabolic rate. We know that there is a period after treatment, say fourteen days, when there is very little effect produced by the ray. The maximum effect of the ray is present only from about the eighth day on. If the metabolic rate is read or estimated around ten days after treatment, the rate must be read just after the effect of the ray has taken place. If there is no stimulation of the gland primarily

before degenerative changes have taken place in the gland, is it not possible that is the wrong time for estimating the metabolic rate? I am asking for information.

DR. R. G. ALLISON, Minneapolis (closing): In answer to the question with reference to the metabolic rate, we feel that in the first few days after treatment we get a little higher rate than we do if we take it eight or ten days afterward. Whether the nervousness of the patient in going through the treatment had any effect on metabolism, we do not know. But we found by taking the basal metabolic rate of different patients every day, taking many hundreds of them, the basal metabolic rate we would get eight to ten days following treatment was the rate the patient kept. In other words, the most constant reading we obtained, was the one taken on the eighth or tenth day following the treatment. If we treated a patient today and had a basal metabolic rate of forty, and we took the rate tomorrow or next day he might have 40 or 55. If we took the rate ten or twelve days after treatment we would get a rate which represented the rate which remained until after the next treatment.

In regard to the x-ray treatment of hyperthyroidism, we started out by treating the ambulatory cases. We treated some patients whose rates were as high as 50 plus, some where it was not over 20. The average was 34 to 36. All were not treated under favorable conditions. Most cases represented people who could not go to bed and we could not therefore always judge our results.

If we take cases with a basal metabolic rate of 65 to 80 and a damaged myocardium, we will not improve the condition any more than we would from surgery, probably not as much. We can often bring these people down to a normal basal metabolic rate, but they die of decompensated hearts.

THE NEXT STEP IN THE CONTROL OF TUBERCULOSIS*

ROBINSON BOSWORTH, M.D.
St. Paul, Minn.

Those among you who have been associated with this organization since its beginning must enjoy a measure of satisfaction in viewing the results of your efforts for better health conditions.

Those of you who have become associated with the organization more recently must have the satisfaction of having invested in a growing concern—a paying venture.

There are indications that point to the ultimate success of our campaign against tuberculosis. I say, "our campaign," advisedly. There are those who make the charge that the steady and remarkable decline in the death rate of tuberculosis of the lungs from 181.8 in 1900 to 111.3 in 1919 has not been due in any degree to the so-called "anti-tu-

berculosis campaign." This is hardly the time or the place to prove or disprove this contention; it should suffice, however, to mention two points. Life insurance companies have taken the greatest degree of interest in the subject of tuberculosis and its decline and give the anti-tuberculosis campaign great credit for the accomplishments so far which are growing year by year. I would suggest that the December, 1921, number of the "Journal of Out-Door Life" be referred to in this connection, as an interesting article appears there by Mr. Frankel, of the Metropolitan Life Insurance Company.

The second point which can be made in support of the anti-tuberculosis campaign is that, wherever communities effect a concentration of recognized anti-tuberculosis measures, the results have been startling. In 1909 a district in Finland was selected for a large-scale experiment in anti-tuberculosis warfare. A clinical examination of practically all the inhabitants was made, and then for ten years an intensive anti-tuberculosis campaign was conducted, with a network of dispensaries, propaganda centres, and many other weapons. At the end of this ten years another mass clinical examination was conducted, and it was found that pulmonary tuberculosis has been diminished 33 per cent. Probably the most startling results have been obtained at Framingham, Mass., where, in an intensive anti-tuberculosis campaign, the tuberculosis death rate in five years had been reduced 67 per cent.

At the Mississippi Valley Conference at Columbus, President Miller reported that it was his belief that the states comprising the conference territory had enjoyed a 33 per cent reduction over the rate existing ten years ago. News of this nature should greatly enthuse all of us and lead us to greater activities in our future work and program. Our future efforts against tuberculosis must be greatly increased; a let-up at this time, because of smug satisfaction at the results so far, would be fatal to the cause. In growing communities our activities must be necessarily increased, or the increase in population, in itself, will lessen the rate of success from our efforts, and also as we eliminate by education, better living conditions, etc., some of the great causes for our former high tuberculosis incidents, we have remaining for us some of the more difficult nuts to crack. It is obvious that the improvements which already have taken place have not been sufficient, and it remains for us to select

*Presented at the annual meeting of the Iowa Tuberculosis Association at Des Moines, February 8, 1922.

some of the existing problems, the solution of which may be more difficult than the ones with which we have so far grappled with more or less success.

The future in our campaign looks big to me,—big, in that some of the problems to be met are big, and big in the anticipated results. For years we have preached for and obtained increasing sanatoria and hospitals for the tuberculous. Recently, we have recognized that not all of these accommodations were of the kind or standard required. Many more institutions are needed. The improvement of our present institutions is greatly needed. Many of our sanatoria are sanatoria in name only. There are low standards of equipment and service that cannot be anything but a check on the results to be otherwise expected. There cannot be great enthusiasm expressed in the results of institutions where conditions permit 35 per cent of their cases returning to their homes after so short a residence as one month. Yet, these conditions did exist in a state system of county institutions and the causes were recognized and acknowledged.

The results of institutional treatment are encouraging as far as they go but they do not go far enough. During the existence of our state sanatorium and our fourteen county sanatoria, there have been discharged among those who remained 30 days or longer, 6,683 pulmonary cases of tuberculosis, and although fully one-half were in the far advanced so-called "hopeless stage," 58 per cent of the total were discharged as much improved, arrested, quiescent, etc., to the number of 3,876. What becomes of these 3,876, after we have cared for them at our institutions at an average of seven months each?

A study in 1916 of patients discharged from Massachusetts sanatoria from May, 1912, to May, 1914, showed that 29 per cent were in good condition and at work. Of 273 patients discharged from Otisville, Raybrook, and Montefiore Home Sanatorium during the period from 1905 to 1910 inclusive, a study in 1913 disclosed 60 per cent working, among those classified as cured, arrested, improved, etc. To some, these figures of sanatoria results may be unsatisfactory, but to me they are inspiring,—inspiring, because I think I can visualize the environment into which these sanatorium patients returned, and more inspired am I when I think of our opportunity, rather our duty, to control this environment.

Speaking of the man suffering from tuberculosis, Krause has well said: "It is his reaction to his en-

vironment which brings him to the sanatorium; it is reaction to the ideal environment of the sanatorium that sends him out apparently cured. It is his reaction to the environment that sends him back to the sanatorium." This should give us a hint as to what is before us in our campaign. At present we are doing very little for the discharged sanatorium case, and, in addition, that larger group who have never been permitted hospitalization and who would never require it if they were properly supervised.

Sanatoria have proven the means for the arrest of the active disease. An environment must be achieved which will enable the arrest to become permanent. It has been said that no plan is complete which does not take into account the entire future life of the patient. The time is rapidly approaching when we will all see that this is true.

There are two sides to the question of the after-care of convalescent consumptives. One is the public side, and we can well understand that they should be interested when it is appreciated that of the 6,683 pulmonary cases discharged from Minnesota sanatoria, 3,305 had positive sputum when they returned to their homes. But there is also the individual side. What is to become of him economically? Must he be forced to compete with strong normal individuals for self-support as at present, and without the proper medical supervision? The lack of organized medical supervision of convalescent consumptives employed on a partially or wholly self-supporting basis is, we believe, responsible for the vast majority of relapses and fatalities among ex-sanatorium patients.

We have forgotten that the control of tuberculosis in the individual is a life-long proposition and we have expected our sanatoria to meet this issue in a four to six months' acquaintance with the patient. It may be stated with truth that the period of convalescence from active tuberculosis is a matter of many, many years, if not the individual's entire life. These years need not be necessarily spent in inactivity as to productiveness; in fact, it is far better for the individual and community should he be properly occupied, else we obtain a fat loafer in exchange for a patient.

Something has already been accomplished towards "sheltered employment" so we may say that the experiment has been tried. Possibly the best illustration is the Altro Manufacturing Company of New York, established and controlled for

tuberculosis convalescents. Previous to its establishment by agencies connected with several institutions, 45 to 50 per cent of the convalescent cases relapsed or died within a period of six months to one and one-half years. Since "sheltered employment" under medical supervision became available, the relapses and fatalities have been reduced to less than 10 per cent. However, with this demonstration of what can be accomplished very little is being done by others to provide similar opportunities for the ex-sanatorium case.

Canadian influences seem to have been already aroused in this connection. In fact, the Canadian Board of Tuberculosis Consultants in their recommendations covering the treatment and after-care of tuberculous ex-service men recommend "sheltered employment" in colonies established for the purpose.

We have recently interviewed officials connected with the Veterans' Bureau which has to do with the treatment of active tuberculosis among ex-service men and their vocational training, and it would appear that up to the present time they have failed to appreciate the limitations of a convalescent consumptive, even after vocational training, so far as his ability to return to his original environment is concerned and become self-supporting in competition with normal individuals.

We are greatly interested in having the government officials recognize early these limitations and take the necessary steps to insure success in the attempt of the government to handle their own tuberculosis problem.

The attitude of those intimating the uselessness of an intensive program for the tuberculous ex-soldier is based, we believe, largely on the well-known fact that tuberculous patients restored in part to health by sanatorium treatment do in large numbers relapse. But they fail to perceive that this is no fault of the institution in which they were treated but the fault of our nearsightedness in not taking proper steps in behalf of the convalescent when he has left the influences of our institutions.

Today an ex-service man discharged from an institution because he is an arrested case, enters vocational training. While under vocational training, he lacks proper medical supervision. The number of cases which relapse while taking vocational training is in itself an index of the inefficiency of the present system.

Tuberculosis is a disease, not only chronic in nature, but relapsing in type. Because a man is an arrested case today is absolutely no guarantee that he does not require for a long period of time as efficient medical supervision as he did during the time he was suffering from active disease. This principle must be recognized.

We are recommending that the Government establish convalescent vocational training colonies associated with institutions in which the patient is to be treated for active disease. We are also recommending medically supervised, organized establishments providing "sheltered employment" after vocational training, which should include the patient's immediate family. This establishment need not be closely associated with the institution in which he was treated for active disease.

REPORT OF THE OBSTETRICAL DEPARTMENT OF ST. MARY'S HOSPITAL FOR 1921*

J. R. MANLEY, M.D.

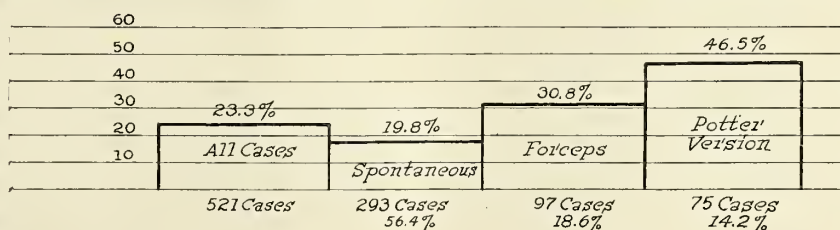
Chief of the Obstetrical Department, Duluth, Minn.

This report is based on all of the obstetrical cases cared for in the hospital during the year 1921, amounting to five hundred and twenty-one. The work was done by a number of different men so that the report will show a fair picture of the work done by the average physician in the city.

I wish to take up first, the question of infections.

I am not prepared at this time to enter into a discussion as to whether a slight fever during the first two or three days of the puerperium is pathological or not. I have taken an arbitrary limit of one hundred degrees as indicating some infection.

You will see by the chart that of all the cases delivered, 23 per cent had a temperature of 100 degrees for one day



*Presented at the Regular Staff Meeting, March 2, 1922.

or more. As might be expected, the cases which were delivered spontaneously showed the lowest incidence of fever, 19 per cent. The forceps cases showed a temperature in 30 per cent, while those which were delivered by version showed the largest percentage of fever, 46 per cent. The chart also shows the percentage of cases which were delivered spontaneously as being 56 per cent, by forceps 18 per cent, and by version 14 per cent. These cases include the temperatures from all causes, whether from slight cold, tonsillitis, pyelitis or what not.

Going over

the charts it was not possible to clearly differentiate the cause of temperature in all cases.

Chart No.

II is arranged to show the incidence of fever during the different months of the year. The first curve

represents all cases; the second, the forceps cases; the third, version; and the fourth, spontaneous. In June, 1921, we adopted the rule that all men delivering obstetrical cases should wear a cap, mask and gown the same as in the general operating room, although gowns and gloves had been in use before. The months following June showed a slight decline in the percentage of temperatures; this is not very marked, however, and may be due to the lowered amount of respiratory infections during the late fall instead of to the use of masks, although I prefer to give credit to the added precautions. The fluctuation of the curve on the version chart is due to the fact that during the first three or four months, only a very few versions were done, perhaps only one or two during the month.

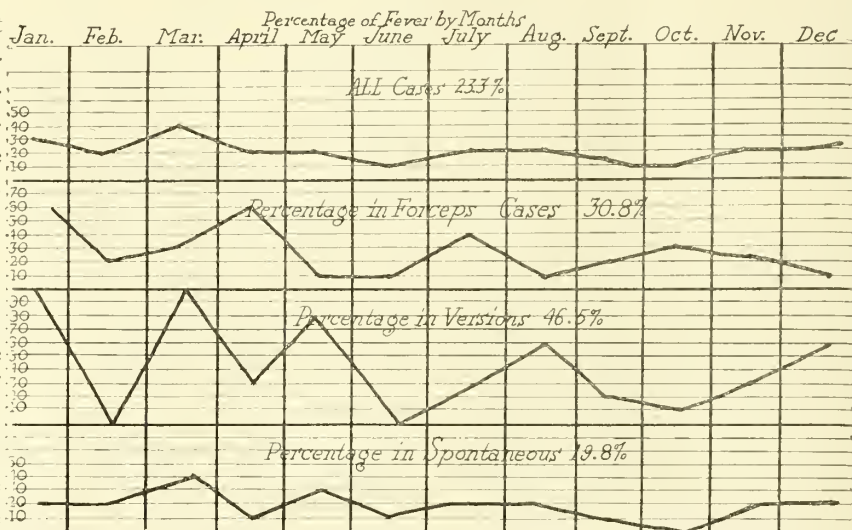
These charts show a rather high incidence of temperatures over 100; however, there has been only one serious case of sepsis resulting in maternal death and that case was infected on admission.

The delivery room technique is satisfactory in my opinion and any further reduction in the ma-

ternal fever will depend on the individual obstetrician in the matter of examinations, being particularly careful not to introduce colon infection into the vagina. In this connection I think we should use more rectal examinations. I am certain that the avoidance of frequent examinations would materially reduce our fevers; we will be forced to do this if our statistics are to compare favorably with other institutions.

There is one suggestion I wish to make in regards to temperature and that is to refrain from

the use of physics following labor, and suggest the use of enemas entirely. This is a great deal easier for the nurses and I believe has some bearing on the question of infection. McPherson of the New York Lying-in Hospital carried on



experiments with a considerable number of cases. He administered physics to a certain number, an equal number being cared for at the same time in the same ward without physics, using enemas entirely. He concluded that there was considerably less percentage of fever in the cases in which physics were not used. I would emphasize the value of a complete general examination in obstetrical cases with fever. A great many fevers are due to other causes than sepsis and the only way to find out whether or not we are getting fevers from breaks in technique is to differentiate the causes. Very few blood counts are being made in these cases; these alone would aid considerably in differentiation.

Fetal mortality was calculated on the number of fetal deaths from seven months of intrauterine life to two weeks after birth. There were thirty-six of these cases, amounting to 6.9 per cent. This percentage of mortality while not extremely high is certainly nothing to be proud of; there is great room for improvement. There have recently been

published statistics of fetal mortality in the neighborhood of 2 per cent and it is significant to note these statistics come from clinics which are notoriously conservative in their methods. The question of a contracted pelvis arises at this point, but I will not go into that except to state that I believe we should do more Caesarean sections in

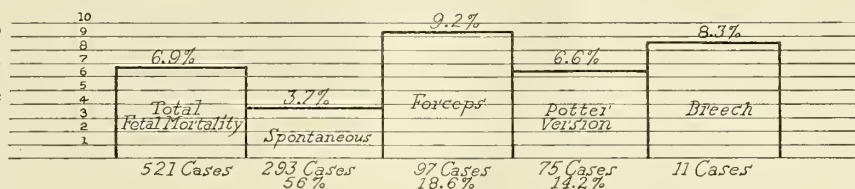
this hospital in the cases of disproportion between the child's head and the pelvic canal. Only one was done last year and that was one of my own in which an ovarian cyst blocked the outlet. The pelvis is only one element entering into the question; the calculation as to the size of the baby is equally important.

I would also urge closer observation of the fetal heart during labor. The escape of meconium in vertex presentations particularly is supposed to show that the child is in distress and delivery should be hurried if possible. This applies to spontaneous labor as well as to instrument cases. I delivered a case this morning which exemplifies this fact. The woman had been in labor for several hours, but had not made much outcry and was not supposed to be having very hard pains. On examination she was found to be fully dilated, the head was deeply imbedded in the pelvis and there had been escape of meconium for about an hour. The fetal heart was getting very weak and slow and her delivery was hastened by low forceps. The baby was very hard to resuscitate but finally lived and is apparently doing well. I think the head in this case had been in the pelvis for several hours and had been subject to great and prolonged pressure, but, owing to the fact that the mother did not make much outcry, she was not thought to be very far advanced in labor.

I wish to bring up again the question of tracheal catheterization for the resuscitation of asphyxiated babies. In my opinion this is the most certain and best means of reviving these babies. I know of three cases in which I am absolutely sure that if the catheter had not been used the baby would not have been revived. It is a little difficult to introduce a catheter into the trachea upon first trial, but with practice it may be easily learned.

Another point which I wish to emphasize is the handling of bleeders. The coagulation and bleed-

and the necessity of treatment before the symptoms of intracranial hemorrhage appear. The routine procedure adopted at a previous staff meeting is ing time is taken by the interne in all cases and I would urge upon the men the value of these findings



infection in newborns has given us some little trouble; a form of impetigo has appeared from time to time among the babies in the nursery. We have carefully checked the form of technique and can find no break but we have asked all men seeing the babies or entering the nursery for any reason to wear a mask and gown and hope in this way to eradicate the trouble.

In the forceps delivery cases in which group you will see the largest mortality, I suggest that the most common fault that we have here is too rapid delivery; it is extremely important to give the head time to mold while applying the forceps, and for intelligent use of the forceps to know the position of the head.

This chart shows the percentage of fetal deaths occurring in different methods of delivery; this percentage excludes the deaths occurring in eclampsia, dead and decomposed babies, and also monsters. You will see that the spontaneous method is the safest for the baby, having only a 3.7 per cent fetal mortality. It is in the forceps cases that we get the largest number of dead babies (9.2 per cent). I think that some of these cases should have been delivered by Caesarian section, and with more careful use of the forceps and taking more time I think we can cut down this group to a large extent. The group of versions shows a 6.6 per cent mortality. I think the same criticism applies here as to the forceps cases; some of these cases should never have been delivered by version. The total percentage, however, is down slightly below the average for the whole series of cases. The breech cases show a high percentage (8 per cent); there are only eleven cases, however, and perhaps this is not so bad a showing. I would call the attention of the men to the fact that the Potter method of doing version in delivering the shoulders and head is very applicable to the breech cases. Bear in mind the fact that the cervix is rather slow to dilate in breech

posted in the delivery room and should be followed as closely as possible. The question of

presentations and the baby should not be extracted until the cervix is thoroughly dilated.

FETAL DEATHS.

Eclampsia—2 cases.

Decomposed—4 cases.

Still born—22 cases. 2 craniotomy (1 hydrocephalus).

Died in 2 weeks—7 cases.

Dead monster—1 case.

MATERNAL DEATHS—.9%, $\frac{9}{10}$ of 1%.

Eclampsia—2 cases.

Shock—1 case (craniotomy.)

Sepsis—1 case.

Resp. Failure—1 case.

Chart No. 4 shows the distribution of fetal deaths. There were two due to eclampsia, four which were dead and decomposed, and twenty-two still-born (two of these were craniotomies on dead babies, one of which was a hydrocephalus). In these twenty-two cases which were still born is where our greatest chance for improvement lies. These cases presumably came into the hospital with live and strong babies, at least nothing in the chart indicates otherwise. That is a rather large number of well babies to lose their lives in the hospital. Seven cases died in two weeks; two of these were bleeders, one of which was not treated soon enough in my opinion; the others died from causes which were not accurately described on the chart. There was one monster, born dead. Maternal deaths made a total of five cases (about .7 per cent). These included two from eclampsia, that is a high percentage considering the small number of eclampsias in the hospital. I would call the attention of the men to the Stroganoff method of treating eclampsia as brought out by the Rotunda Hospital of Dublin: they have reduced the percentage from above 20 per cent to less than half of that by washing out the stomach, irrigation of the bowel, free use of morphin and chloral and letting the pregnancy alone. There was one case of shock following difficult labor in which craniotomy was done. There was one case of sepsis in which the woman was infected and running a temperature when she came into the hospital. The autopsy showed a large abscess in the broad ligaments, in one case in which the death was given as respiratory failure and there was no other cause of death given and no autopsy. All of these deaths have been discussed at the Staff meetings as they occurred and we will not go into them any further. This maternal mortality is too high and should be in the neighborhood of 0.2 per cent.

The standard of obstetrics has been rather low here in the city as well as throughout the county generally. By that I mean that the men have seem-

ingly been satisfied with mediocre results. They take a fatalistic attitude when they lose a baby saying that it couldn't be helped; but they take great credit for saving the mother and father. This attitude is changing, however, and the public will soon demand as good service in obstetrics as they now receive in pediatrics.

SURGERY IN THE PERFORATION OF TYPHOID ULCER*

F. C. SCHULTZ, M.D., F.A.C.S.

St. Paul, Minn.

During July and August, 1920, the prevalence of typhoid fever in St. Paul commanded the attention of both local and state Boards of Health. As every summer has its quota of typhoid cases I take the liberty to present the subject of typhoid fever with special reference to the perforating ulcer, with report of a case.

Mr. S., aged 42, was first seen on June 27, 1920. At that time his temperature was 101, pulse, 78; he felt weak and languid. No diagnosis was made at this time, and because of the excessive hot weather it was thought that he was suffering from insolation. In a few days he felt better and was able to go to work. After about ten days he came home in the evening with a hard chill. This was July 14. He complained especially of pain in his neck and back, and of being very tired in his legs; his throat was reddened, temperature 101. I saw him again July 19. He felt tired and had a pain in his back; temperature 100, pulse 84. The Widal test taken was negative but indications pointed to a typhoid with some reservation because there was no typhoid prevalent. The following day, July 20, his temperature was 100 and pulse 72; he felt better. At three P. M., July 21, he developed a severe pain in abdomen accompanied by a diarrhea. His abdomen was rigid but he had been having so much muscular pain in his back and neck that anything serious was not entertained and morphine gr. one-fourth was given him which gave much comfort, and three hours after there was no pain or tenderness. Nevertheless a perforated typhoid ulcer was suspected and the patient was advised to go to the hospital that evening. That night again there was an attack of pain, again relieved by morphine. The Widal test was again negative and the leucocyte count 15,500. Diagnosis: a surgical abdomen with a possibility of a perforated typhoid ulcer.

Operation 3 P. M., July 22. As soon as the peritoneum was open we had an inflamed and congested bowel presenting. Further in, a fluid with yellow flakes was sponged out and now searching for the ileum we found it a much inflamed bowel, on its surface a fibrinous deposit, a perforation in the center of an indurated area one-eighth of an inch in diameter, about 8 inches from the cecum, and another hole about 14 inches from the cecum, pin point in size. Bowel content came through both these openings.

*Presented before the Southern Minnesota Medical Association, Mankato, December, 1921.

Using the principle of sewing healthy bowel to healthy bowel we were able to close over the perforations. A linen suture was used. The wall of the bowel was rigid and very much indurated and any stitch placed in the area of induration tore out promptly. Extending upward were several areas of induration but how far up was not ascertained as it was urgent for us to get out. There were no other perforations. The incision was closed, using a silk-worm gut double loop lateral stitch. Drainage was established through the wound and another stab wound to the left of the midline.

The convalescence was not stormy, no more severe than a favorable pus appendix. In fact, when I expected his typhoid to continue its course it certainly was abbreviated. This may be due in part to the vaccine which was given.

July 23. Condition fair. Beginning to pass flatus. Pulse remains good. Drainage good.

July 24. Good drainage, abdomen quite soft, much flatus. General condition exceptionally good.

July 25. Feels very well, slept well.

July 26. 10 A. M. Wound dressed. Two drains removed. Abdomen soft.

July 26. 5 P. M. Has had a chill and a temperature rise to 104.4 and a pulse rise to 128, the highest pulse reading during the whole illness. Abdomen was not distended. At the time I found no apparent cause for this sudden rise of temperature and pulse and subsequent convalescence was uneventful.

July 27. Condition all day quite comfortable.

July 28. Feels well. Wound dressed. Abdomen soft, a good free pus discharge from drains.

July 29. Seven days since operation. Abdomen soft and had a large normal stool yesterday. Condition good.

July 30. Another drain removed. Skin stitches removed. Had his second big stool today. Abdomen absolutely good.

August 2. Last drain removed. Abdomen good. Temperature normal this afternoon for the first time.

August 6. Stitches removed. Wound doing well.

He continued to improve and has been perfectly well since.

Two negative Widal tests reported from different laboratories and more than two weeks after the illness began and the sporadic nature of the case caused some hesitation in diagnosis. Nevertheless the aim, when surgery was proposed, was a perforated ulcer in the ileum. The question of the best time to operate arises, and, of course, as soon as diagnosis of perforation is established or if there is a strong suspicion, it is advisable to do a laparotomy at once. No doubt we had a perforation 22 hours before and had our Widal been positive probably operative procedure would have been done at once and the perforation closed. Is it possible that we might have had another perforation on the following day, the case terminating fatally in spite of having closed one perforation successfully?

Typhoid fever is pronounced a disappearing disease and truly when we recall the past few years there has been a dearth of typhoid so that the profession is off its guard and may fail to make a diagnosis. Many nurses graduating in the recent years have not had an opportunity to nurse typhoid nor have they seen any cases. Through the courtesy of our health commissioner, Dr. F. B. Simon, I was able to compile the typhoid cases during the past ten years with the mortality rate. It will be noted that during a four year period there were very few cases, but a small epidemic was evident last summer.

Year	No. cases	No. deaths
1911	123	22
1912	124	23
1913	160	19
1914	161	24
1915	151	18
1916	53	12
1917	42	6
1918	47	9
1919	41	8
1920	104	5
	1,006	146

Mortality for ten years, 14.5%.

Mortality for past year, 4.6%.

Much credit is due the various health authorities for the prompt action in curbing the epidemic. They personally visited all patients and got a complete story of their whereabouts for a certain period. Also the prophylactic vaccine therapy given those exposed has done much to prevent the spread of typhoid, and therapeutically given has probably shortened the illness. In an epidemic in Montevideo, South America, Devincenzi² reports an epidemic of an ambulant form with an alarming rate of perforation. He points out further that the clinical seriousness of the case and the great number of ulcerations are not criteria for perforation.

Pathological Anatomy.—The cause of the perforation is brought out by Devincenzi where he states, "The anatomical cause is a necrosis brought about by a thrombosis of the small vessels of the follicles. If necrosis is complete, we have a perforation and a peritonitis. If necrosis is only partial, not involving the peritoneum, we have no perforation but an intestinal hemorrhage."

As mechanical causes he cites: (1) alimentation

too profuse; (2) defecation with too violent muscular contraction; (3) purgatives or intestinal lavage.

After the etiological agent enters there are four stages pathologically: (1) catarrhal; (2) infiltration; (3) ulceration, with or without perforation; (4) reparation.

As to the relative site of the ulcer in the bowel, there is very little in the literature. The writer, in looking over Osler's magnificent material in the pathological museum at the Royal Victoria Hospital, Montreal, took note of the peculiar uniformity of the lesion being situated antimesenteric.

Diagnosis.—The abdominal picture presented by a perforative typhoid offers nothing that is characteristic. It is the picture of a severe general peritonitis due to a perforation. The presence or absence of leucocytosis does not give absolute assurance whether a perforation exists or not. Blood count and Widal tests have only relative values.

In simple uncomplicated typhoid we have, as a rule, a leucopenia and an increase of leucocytes is of greater importance than change of temperature or pulse rate. A leucocytosis indicates a complication. If a chill accompanies it, it may mean pleural effusion or other pulmonary involvement and a careful search of the chest would clear this condition. When the pulse becomes rapid with a collapse and some pain, the picture is rather plain for a hemorrhage. But, when the pain in the abdomen comes on suddenly and is very severe, the abdomen becoming of a boardlike hardness and the patient lies almost motionless and fears to move; when a tympany of the abdomen develops with or without obliteration of liver dullness, but often accompanied by diarrhea—this is very suggestive of a perforation. Pain is most severe toward the pelvis. However, the local tenderness may not always be in the ileum, as we shall see that the perforations have been mentioned in every portion of the bowel except the duodenum. Pain may be in unusual locations as in the end of the penis, in the perineum, in the epigastrium, or in the left hypochondriac region as reported by Schisler. Another mentions vomiting in 17 out of 19 cases. An important diagnostic hint is given by Peck: "Where local symptoms are very marked and the constitutional fairly severe the indications are for a perforation, but where the constitutional are very profound and the local symptoms not equal to the severity, we must then consider a thrombophlebitis."

The various complications due to typhoid simulating perforated ulcer found by the different writers either at operation or post-mortem are as follows: (1) appendicitis; (2) cholecystitis; (3) perforative cholecystitis; (4) gangrenous gall-bladder; (5) abscess of liver; (6) perforated mesenteric gland; (7) phlegmonous urinary bladder; (8) thrombosis of one or both internal iliac veins; (9) acute intestinal obstruction; (10) acute pelvic infection.

Gangrenous gall-bladder has been found by Mixer due to typhoid infection. Mixer is so enthusiastic over doing a laparotomy for suspected perforation that he urges this done before positive signs are present. He says, "The rule of operating before a positive diagnosis is made is a most excellent one, and a strong suspicion of perforation demands immediate action." Mixer says, "If this serious complication is unrecognized and not operated it is always fatal." Different writers mention acute appendicitis occurring. Hemorrhage may simulate it. Gibbons states, "It is to be remembered that a pneumonia and perforation, and a hemorrhage and perforation may coexist in the same patient." He further reports having overlooked a second perforation, and having reoperated in another case, and found a second perforation. In another, a perforation was found in the ascending colon. Thrombosis of the internal iliac vein has been found at autopsy coexisting with two perforations; in another, a thrombosis of both internal iliac veins with pyelonephritis and intestinal perforation.

Perforation at the junction of the ileum and jejunum and a second perforation in the jejunum, one case with three perforations and one case with five perforations were reported by Gibbons. Stokes and Amick report that in a medical student who had had typhoid fever 13 years ago, an operation was performed for an acute appendicitis. The appendix was found to be gangrenous and about to rupture, and culture taken showed typhoid bacillus. This is an instance of the typhoid carrier.

Gage thinks that, "Here may be included the sharp angulation or stricture found in the appendix at times which may be due to a healed typhoid ulcer." He further reports an acute suppurating gangrenous appendicitis at the beginning of convalescence from typhoid. Bacteriological cultures showed streptococcus and bacillus typhosus. He believes that if more of the so-called accidental cases of appendicitis during typhoid should have

bacteriological examinations, typhoid bacilli would more often be found. Typhoid bacilli also have been found in the gall-bladder seven years after.

Dr. Roger Vaughan reports on 1,000 cases of typhoid in Cook County Hospital, and twenty-five cases of perforation. Of these, ten were diagnosed at operation, eight by autopsy and seven on clinical findings. All these twenty-five cases died, but he reports that they were all seen late and urges pathognomonic signs be recognized so that the operation be done sooner. Out of 500 cases of typhoid fever 40 per cent were free from pain and tenderness and less than 20 per cent had tenderness. Another diagnostic point is the blood pressure rise which comes on in a few minutes after perforation. In a series of 115 cases the mean systolic pressure in the first week was 115, while in 20 cases of acute peritonitis the mean systolic was 166.

Prognosis.—The immense majority of perforated cases under medical treatment die after a few days of a progressive peritonitis. The statistics of the mortality tables will show very clearly what the prognosis is.

That they may recover is shown by Dr. Peck in the discussion which brought out that a perforation may seal over as in duodenal ulcer. Recalling a case he operated on 20 years after a typhoid, for intestinal obstruction, he found a coil of small intestine matted together. In separating these he found he had a hole in the loop of ileum.

Treatment.—With the ileum so completely involved that the bowel is a stiff indurated tube for the last eighteen inches of ileum, with one or two perforations in this portion, it is quite a problem to safely cover the holes. It is merely a loss of time trying to place sutures in the indurated portion. However, an attempt should be made to close the perforation by suturing healthy bowel over the hole. No tension should be put on sutures, as they surely will not hold.

Dr. Blake brings out the point of leaving the perforation open, only draining when the condition is too grave to warrant much operating. Others advise bringing the bowel to the surface and suturing it into the wound. This may be well advised surgery when the case is in extremis or where multiple perforations are present and resection is ill advised. In the less severe cases it may be advisable to resect a portion of the ileum. This has been done repeatedly. Bazin of Montreal resected 51 inches of ileum and the patient recovered.

Others warn against the resection, saying that even 36 inches of ileum resected is not compatible with life in many cases, as important functions are carried out in this portion of the ileum. In the resected cases that recovered, the typhoid fever came to a rapid end. In those cases where perforation occurs late, after convalescence has been established, the prognosis is claimed by some writers to be better than when it occurs at the height of disease.

When available, Crile's method, gas oxygen anesthesia with novocain infiltration, should be the method of choice. The operation should be performed as rapidly as possible and with generous tampons to prevent unnecessary evisceration. When the operation is done, free drainage should be established. Drainage tubes should not come in contact with suture as this might encourage fistula formation. Counter openings for more free drainage if the pelvis is filled is indicated. Various methods of drainage are mentioned. It does not make so much difference as long as the drainage is sufficient. One method of treatment used by several writers I certainly think should be discontinued, and that is the abdominal lavage with normal saline. This was the method used in one series of ten cases of perforation and all died. Other factors might have been the cause but such a result is food for thought.

When reading over the literature, it is noticeable how many cases have developed hernia, and here I would like to mention the method of suturing. I have long been convinced that there is not another suture so dependable as the double loop lateral silk-worm gut as devised by Dr. A. Schwyzer, when there has been an infection to contend with. After sutures are tied we have a full view of fascia and are able to determine the approximation. Suture tension should not be too great, but this tension will be continued where the figure-eight suture very soon cuts through the skin and the tension is relaxed. With several feet of bowel involved, the chance of several perforations is plain. It was our good fortune to be there at an opportune time. Further, a surgeon is reluctant to do an extensive bowel resection, for here we have a patient who has been sick several weeks, weakened by fever and low feeding and possibly by diarrhea and hemorrhage. It is emergency surgery where the byword is "by all means get in and get out quickly." It is a fact that typhoid patients, as sick as they are, bear laparotomy well.

Von Leyden in 1884 was the first to suggest surgical measures for perforation and that same year Mickulics closed a perforation by suture. He said, "If there is suspicion, don't wait for an exact diagnosis. Explore immediately for it is free from danger."

In an interesting article and discussion by Thacher it is brought out that to err on the side of not operating when surgery was indicated was far greater than to have erred and operated when no perforation was present. These cases from his reports, where no perforation was found but suspected, not only recovered but the convalescence was shortened. Statistics, too, tell us in what percentage of perforated cases there is recovery without operation—it is small. Of 32 perforations in the Royal Victoria Hospital, 25 per cent of those operated recovered and 15.3 per cent of those not operated recovered. This is the most optimistic report found in the non-operated cases. The question arises—were they perforated?

Treatment After Typhoid.—There is no need of removing the gall-bladder from all patients who have had typhoid. But if there are symptoms of cholecystitis and they are carriers of typhoid it may be advisable to operate, although reports declare that the patient may still remain a carrier. Occasionally a gall-bladder is found filled with pus and mucus and gives pure cultures of typhoid. These must be carriers. (Mixer.) It is another reminder that in some of the cases of cholecystitis, pericholecystitis, acute angle deformity in the appendix of apparent cicatricial healing of an ulcer, some of the cases of diffuse adhesive peritonitis of long standing in the cecal and ileal region, are the result of typhoid. If a convalesced typhoid patient becomes entirely well and is not a typhoid carrier, is it not reasonable to suppose that the typhoid bacillus may have been exterminated, as the bacillus of typhoid does not resist light or drying. Sewer pollution could be controlled if there were not a continual reinfection of the sewer by the typhoid carrier with unhealed appendix or gall-bladder. Nowhere in the literature is any mention made of a typhoid ulcer remaining unhealed.

It will be further noted that the mortality rate of 4.8 per cent is very low during the last year. My impression is that the typhoid vaccine therapy may have been responsible for this good showing. A glance at the larger statistics has some points of interest. Statistics gathered by Dr. Garibaldi Devincenzi are the largest found in the literature.

He reports on a total of 22,113 cases of typhoid fever in available literature and in this number there were 825 cases of perforation giving a percentage of 3.73 per cent. General mortality of all typhoid fever averages 8.05 per cent.

Gibbons collected a series of 27 cases that were not operated and all died. In one-fourth of the cases that die after operation for perforation, autopsy showed a second perforation. Perforation predominates in males in a ratio of 3 to 1. Perforations occur most frequently between the ages of 20 and 30 years and are exceptional after 50 years.

Table showing the operative mortality:

Author	Cases operated	Mortality
Gibbons	112	75.9
Ashhurst	86	82.5
Johns Hopkins H.	16	62.5
Keen	158	76.59
Devincenzi	13	61.54

Of all deaths from typhoid the percentage due to perforation is here given by various authors:

Long	80	per cent
Hoelscher	17.25	per cent
Osler	25	per cent
Scott	33.3	per cent
Devincenzi	34.36	per cent

The size of perforation is designated by various measurements. I have collected from the reports of 87 cases the following:

Size	No.	Size	No.
1 mm.	7	Goose quill	1
2 mm.	6	Pea size	3
3 mm.	5	Small size	9
6 mm.	1	Large size	2
7 mm.	1	Dime	3
1 cm.	3	Quarter	1
1.5 cm.	3	Lead pencil	1
2 cm.	3	Tip of finger.....	1
1/8 inch	5	Half penny	1
1/4 inch	1	Grain of rice.....	5
Pin point	2	Grain of corn.....	6
Pin head	17		

The various locations in which these perforations may appear is best shown by the following table in 106 cases in which the site was designated.

Jejunum	3	Appendix	2
Ileum 40-50 inches..	5	Cecum	2
Ileum 20-40 inches..	10	Ascending colon	2
Ileum 10-20 inches..	23	Descending colon....	1
Ileum 5-10 inches...21		Rectum	1
First five inches....	33		

Table compiled from cases available in the literature showing the number of cases perforating at the different periods of illness:

5-10 days	7
10-15 days	18
15-20 days	29
20-25 days	21
25-35 days	12
35-45 days	4
47 days	1
116 days	1

It will be seen that by far the greatest number of perforations occur during a two week period from the tenth to the twenty-fifth day.

1. Blake, J. B.: Discussion. J. A. M. A.
2. Devincenzi, Garibaldi: *Anales de la Facultad de Medicina*. April, 1919.
3. Gage, Homer: *Trans. Am. Surg. Assn.* 1915. Vol. 33, p. 132.
4. Gibbons, John H.: *Trans. Am. Surg. Assn.* 1915. Vol. 33, p. 63.
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6. Schisler, Edwin: *Missouri State Med. Jour.* 1917. Vol. 14, p. 398.
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DISCUSSION ON THE PAPER OF F. C. SCHULTZ.

DR. T. L. CHAPMAN, Duluth: In talking with Dr. Schultz about these cases, he asked me to report briefly a case of my own. I did not see very much reason for doing that, because I tried to point out to him that as far as the moral lesson was concerned, there is none in my case. If there is anything to be learned about a perforating typhoid ulcer after one has seen several of these cases, it is that everlasting watchfulness of the case throughout all the peculiarities of convalescence of typhoid and for a long period afterward, is the only chance that one will not overlook a death dealing lesion of this kind.

In the case under discussion the woman was not thought to have had typhoid, although she came from a part of the country that was notable for typhoid, and where some typhoid had occurred at that time. She was seen rather casually by a doctor in the country for a small illness that seemed to give no exacerbations, and he believed it to be a recurrent series of attacks of appendicitis. He saw her soon thereafter with a stiff belly, with vomiting, pain, etc., and sent her at once to town, where I opened her abdomen with a view to confirming the diagnosis of a presumed rupture of the appendix. As a matter of fact, she had three perforations simultaneously within nine inches of the ileocecal valve, one larger than my thumb nail and in such a position and of such an extent that no closure could be made. I presumed at the time they were typhoid ulcers, and in spite of that did an end-to-end anastomosis. At that time I was deeply under the influence of Dr. Con-

nell's work, and used his circular suture. The woman should have died theoretically. She was brought forty miles after perforation of her ileum in three places. She had an extensive peritonitis at the time I operated. In the face of that resection and in the face of the difficulties I did an end-to-end enterorrhaphy, and she got well.

CHLOROFORM ANESTHESIA*

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In spite of all the advances made, the questions relating to anesthesia are still far from being settled. Dr. Keen in his surgery says, "The ideal anesthetic will not be one which abolishes pain, without abolishing consciousness. To have the patient aware of surgical emergencies, which test the veteran operator's skill and endurance to the utmost, would frequently invite death by the terror which it might occasion. The ideal anesthetic will abolish pain by the abatement of consciousness, but without danger to life." Hence the ideal anesthetic, at least for severe operations must necessarily be a general one in view of the opinion of our best surgeons.

That the ideal anesthetic has not been found is evidenced by the numerous ones in use, singly and in combinations,—chloroform, ether, ethyl chloride, nitrous oxide, nitrous oxide and oxygen, nitrous oxide, ether and oxygen, etc. Different men use different methods and combinations.

In this country, chloroform has gradually been replaced by ether and more recently by nitrous oxide, alone and in various combinations. Although nitrous oxide has been hailed the safest of all the general anesthetics, yet Gwathmey and Greenough¹ say, "Advocates of straight nitrous oxide and oxygen anesthesia are probably responsible for more deaths than are the advocates of any other one anesthetic or single method. When a patient is saturated with nitrous oxide with sufficient oxygen to maintain satisfactory anesthesia, he is bordering on, or may be in the danger zone and the next step will be respiratory arrest and death." This tends to show that nitrous oxide is far from being the ideal anesthetic.

I well realize that for a physician to defend the use of chloroform anesthesia at the present time

¹Gwathmey and Greenough: *Annals of Surgery*, Vol. 74, p. 185, August, 1921.

*Presented before the Southern Minnesota Medical Association, Mankato, December, 1921.

is about as popular a pastime as to stand up and defend the Non-Partisan League in a Republican County Convention. Yet I feel that chloroform has a definite place in anesthesia and that it should not be lightly discarded. Medical men are prone to adopt new fads, often at the expense of old and tried remedies, often substituting more dangerous and less reliable methods before they are fully tried out.

I do not intend to present a scientific paper nor to quote a mass of statistics, but shall treat the subject only from the basis of my own observation as a general practitioner who has administered chloroform in several thousand cases.

That chloroform as an anesthetic is absolutely dangerous and that ether is absolutely safe is a statement very often seen with many variations and modifications in medical literature. Both statements are of course incorrect. I well realize that for an operation of length where the patient must be absolutely and thoroughly under the anesthetic for a long period of time, ether is a much safer anesthetic than chloroform and should invariably be given. But in the hands of the general practitioner chloroform has a place which I do not feel that ether can completely fill. While for short anesthesia we have other agents such as nitrous oxide gas and chloride of ethyl, skilled assistants are too often lacking, and, without them, I do not feel that nitrous oxide gas and chloride of ethyl are as safe as chloroform, to say nothing about the cumbersome apparatus needed for the administration of the former.

One reason why chloroform is so much feared as an anesthetic is no doubt because of the fact that when chloroform kills, it does so more or less suddenly; consequently, there is no doubt as to where to place the blame. Ether may, and no doubt often does, cause death days and even weeks following the administration of the anesthetic, death being due to pneumonia and its complications or destructive changes in some vital organ. Owing to the length of time that has elapsed since the ether was administered no doubt the operation often receives the blame when the anesthetic was really the cause of the patient's death. Certainly pneumonia is not an uncommon complication following ether anesthesia and as a rule the mortality in these cases is not a small one. Sudden death on the operating table when ether is administered occurs frequently enough to show that even ether

is not an absolutely safe anesthetic. I believe that if our statistics, relative to anesthetics, could show the actual number of deaths directly and indirectly, primarily and secondarily due to ether, that the difference in the mortality rate of chloroform and ether would be far less than we are taught to believe.

Ether being considered so safe by many men no doubt often tends to a false sense of security and frequently makes the surgeon both slow and careless. With a feeling that the patient is in no danger it is not so very unusual in some clinics, especially in our large cities, to see patients kept under ether anesthesia for ten to thirty minutes before the operation while the surgeon is washing up or lecturing. Ten to thirty minutes of unnecessary anesthesia can hardly be considered a good thing for the best interest of the patient and if it was not because of the fact that ether is considered so relatively safe the practice would no doubt be less common.

I believe that to give chloroform well as an anesthetic is an accomplishment many men do not possess and are apparently not willing to learn, and that a physician who is in the habit of giving ether is by no means a safe man to administer chloroform. Chloroform should under no circumstances be forced, but should be given very slowly and a much longer time consumed to put the patient to sleep than is usually considered necessary; much more air should be allowed than is generally the case. The mask used should be made like the ordinary ether inhaler used for the drop method of anesthesia, but can be somewhat smaller; the amount of gauze covering said mask should ordinarily not be more than four or five thicknesses of a medium weight gauze. The small glass ampule now on the market is an ideal container for chloroform when used as an anesthetic. The point should be broken off so as to leave a very fine opening, hence insuring a minute drop which given slowly on the open gauze mask insures the patient of a relatively large amount of air inspired. Personally I believe in watching the patient's color and respiration more than anything else, though the heart cannot, of course, be slighted. Do not fail to frequently remove the mask from the patient's face during the administration.

When by force of circumstances, as frequently happens in a general practice, a doctor is compelled to have a short anesthesia for a minor opera-

tion, say following an accident, such as placing a few sutures, ligating an artery, setting a broken bone, reducing a dislocation, etc., given a patient entirely unprepared, stomach full of food, it is often possible to give chloroform, do the operation and have the patient ready to go home in a comparatively short time. If the day is cold and stormy, I do not feel that it is safe to send the patient to his home right after administering ether, especially if he lives some miles in the country, but do not feel the same degree of hesitancy when chloroform is used, and often allow them to go home in an hour or two from the time the anesthetic was administered.

Personally, I like ether anesthesia and a suction apparatus for removing tonsils and adenoids in children under fifteen years of age, but we have operated on several hundred patients by using chloroform anesthesia and the Sluder method of removing the tonsil. With chloroform a light anesthesia only need be used and the operation and the anesthetic together can be completed in a very few minutes, certainly in less than half the time that would be necessary were ether used. However, I am not advocating chloroform anesthesia in this class of cases, but, given a young patient with the post-nasal space packed full of adenoids, with badly infected tonsils and a generally weak physical condition, choking with a throat full of mucus, I am not so certain but that a light chloroform anesthesia and a rapid Sluder or Beck operation followed by a quick removal of the adenoids, all taking, in skilled hands, but a few minutes at the most, is not a relatively safer method than the one often seen in some nose and throat clinics where the anesthesia, from the time the ether is commenced until the operation is finished by a most tedious dissection, occupies in the neighborhood of an hour's time. The fact that pulmonary abscess occasionally develops in these cases is not to be wondered at. In fact, it is rather surprising that it does not happen oftener. One of the advantages of chloroform in these cases is a comparatively rapid anesthesia. But little screaming and struggling and frightening of the child occurs and there is freedom from mucus in the throat, rapid recovery from the anesthetic and much less danger from an aspiration pneumonia or pulmonary abscess.

In obstetrics, chloroform is holding the field to the exclusion of other anesthetics with quite a number of doctors; in fact, many men who seldom use

chloroform in the balance of their work have found it hard to do away with it entirely in their obstetrical practice. While many methods are in use, the following has served me well. A small heavy inhaler, with two tips that fit into the patient's nostrils, is packed with enough absorbent cotton so that it will hold two or three drams of chloroform. The patient is allowed to hold the inhaler herself and instructed to inhale the chloroform as soon as she feels the pains coming on. If she goes to sleep, the inhaler, being heavy, drops out of her hand to be picked up again with the next pain. I have in slow, tedious cases of primiparae often used chloroform in this manner for hours and have never seen any bad results from it. The total amount of chloroform actually inhaled is small. The relief from pain both actual and psychic is very marked. The edge is continually taken off the pains and the patient feels that she is being helped and that something is done for her. When the head passes the perineum it is a simple matter to give her sufficient chloroform on a towel or napkin to get complete analgesia and if a rupture threatens the perineum and complete anesthesia is wanted, a few minutes will suffice to reach it. If the placenta is to be expressed by the Creaé method or a few sutures are to be placed, a light chloroform anesthesia is thus easily gotten. The above outlined method of anesthesia in obstetrics has been used for many years and no evil or untoward results have been noticed. I have used ether in obstetrics but do not feel that it can ever take the place of chloroform in this class of cases. With me it seems that chloroform used in the previously described manner is about as ideal a twilight sleep as can well be imagined. Perhaps the more modern method of using nitrous oxide gas may be preferable, but with the cumbersome apparatus necessary and the lack of skilled assistance usually encountered in general practice it will not become popular in the country at least for some time to come.

I would like to say a few words about the use of chloroform for the induction of so-called primary anesthesia (the so-called chloroform or ether rousch of the Germans)—a method that has been known for many years and, while no doubt used by many physicians, does not seem to be universally understood. Primary anesthesia will often suffice for the pulling of a tooth, lancing of a boil, felon or other deep infection, an infected toe or finger nail, removing of a painful splinter, reducing a dis-

located shoulder, and will do in a considerable number of fractures. In fact, it is an ideal method for the performance of any operation that can be done quickly or at least in a very short time, without deep or lengthy anesthesia. It is often extremely valuable where you are dealing with an unusually apprehensive patient. The following method is used.

Drop the chloroform in small drops on the mask prepared as previously described. Count slowly but loudly, one, two, three, four, etc., and let the patient repeat. When the patient loses count or miscounts, drop the chloroform rapidly for a few seconds, remove the mask and proceed with the operation. In nearly every instance the operation can be done absolutely without pain. The patient will wake up almost immediately after the work is done and state that he felt no pain whatsoever, but often adds that he knew the operation was taking place. He will usually be able to walk about the room in a very short time, only feeling a bit dizzy, and can ordinarily be taken home very soon. Personally, I have used the method hundreds of times and have never seen any bad effects from it and in very nervous patients it often gives wonderful relief. Even with the stomach full of food they will rarely vomit when this method is used, and, if they do, it will be after all is over and the patient awake. It will then do no harm as there is no chance for aspiration. For that reason alone it is often of great convenience following accidents as well as for many of the short operations mentioned previously. The method is deserving of much more attention and consideration than it has had from the profession. In fact many doctors seem to be entirely unfamiliar with its application. Ether can be used in a somewhat similar manner but to me at least it has never seemed to be so effective.

In conclusion.—The difference in safety in administration between chloroform and ether is probably far less than commonly stated, as numerous deaths are indirectly caused by ether that are not so classified in the statistics.

Chloroform has a number of good qualities that we should not overlook and I cannot agree with many physicians who seem to think that chloroform should be banished entirely as an anesthetic.

Many physicians who deprecate the use of chloroform do not know how to properly administer it and are apparently unwilling to learn. I grant that chloroform anesthesia is not safe with the inexperi-

enced interne, the unskilled nurse, occasional bystander nor the man who is ordinarily in the habit of administering ether.

I do not wish to carry the idea that chloroform can displace ether nor take the place of it for lengthy and deep anesthetics; but that, given a suitable case, properly administered chloroform has a place in our armamentarium that no other anesthetic hitherto used can fill quite so well.

DISCUSSION ON THE PAPER OF DR. P. F. HOLM

DR. O. C. STRICKLER, New Ulm: The subject of anesthesia is a very important one. Surgery is becoming more and more popular, so that the giving of anesthetics is becoming more and more frequent, and a discussion of chloroform anesthesia, ether anesthesia, nitrous oxide gas, or whatever anesthetic is used, is certainly one well worthy of serious consideration. However, I would criticize the statement of the essayist that ether is liable to produce sudden death. I doubt whether that is the case. Furthermore, I doubt whether any person should use chloroform alone except in obstetric work.

I visited a colleague in a neighboring city who told me of an unfortunate experience he had in the case of a boy, twelve years of age, who was brought in with an injured foot. The doctor proceeded to give an anesthetic so that the injured foot could be examined. He gave chloroform. The ankle was examined, and when the practitioner finished his examination he was horrified to observe that the young fellow was dead. Had he given ether I doubt if that would have occurred. I would repeat, that in the administration of an anesthetic for an injury, for any condition needing a close examination, be it a case of dislocation or of fracture, ether is preferable. I do not criticize the administration of chloroform in obstetric work. There the anesthetic is given intermittently, but in general work, when the doctor is alone, I doubt the propriety of giving chloroform. I doubt whether we should give chloroform on account of the difficulties that we have in cases of malpractice or in case an untoward accident occurs. I doubt if the profession would support us if we had a death or any unusual condition occur if we had used chloroform.

In later years we have used ether almost entirely. We have used chloroform in selected cases, and also in primary anesthesia preceding ether. I do think, however, that chloroform has its place, but I think its use outside of obstetric work and outside of some limited cases for the general practitioner should be limited.

DR. RALPH T. EDWARDS, Elysian: With regard to sudden death under anesthesia, it is a thing that has not occurred in my practice, but it was threatened once. That was when I used ether anesthesia. Having used ether as an anesthetic for a minor gynecological operation on a patient who was very much weakened and the operation having been successfully completed, in about ten minutes after the anesthetic was discontinued the patient suddenly stopped breathing. It took us half an hour before we could get a single respiration from that patient. I simply state this

case as a fact. I am not arguing that ether or chloroform is especially dangerous, but am stating this case for your benefit. Personally, I am afraid to use chloroform in such cases as that. I use chloroform only in obstetric cases.

DR. BYRON O. MORK, Worthington: With regard to chloroform, I remember how we had it drilled into us at school that this was not a safe anesthetic to use. Where I served my internship there were several surgeons, graduates of European universities, who insisted on the use of chloroform as an anesthetic. I was afraid at first and gave it only because they insisted on its use. I had to take a real course in chloroform anesthesia. And I think now the trouble with us is that we have given ether so much we do not know how to give chloroform. We are apt to crowd it too rapidly. If we give plenty of air with chloroform, it seems to me, we can get along very nicely with it. I realize it is not popular, and I do not use it a great deal myself. If I gave the anesthetic myself, I would not be afraid to use it for any operation.

DR. P. F. HOLM, Wells (closing): I expected my paper to provoke a great deal of discussion, as that was one of my reasons for presenting it.

I do not think I feel very differently about anesthetics in general from what the rest of you do, but I do feel at the present time there is a tendency to limit ourselves too closely to ether; that we have probably gone too far in the use of ether. I feel that chloroform has a place, and that if you learn how to give it, and properly use it, it is of value and should not be relegated to oblivion entirely. That a sudden death may occur on the table with chloroform I am willing to admit, but sudden deaths on the table occur also with ether.

THE THYROID AND ITS RELATIONSHIP TO NERVOUS AND MENTAL SYMPTOMS*

CHARLES R. BALL, M.D.
St. Paul, Minn.

In the beginning of this discussion on the nervous and mental symptoms of the toxic thyroid, it is perhaps in order to state that the nervous elements of the body are affected by the same things and in much the same way as the other tissues. The pathology of congestion and inflammation in the brain is much the same as the pathology of congestion and inflammation in the liver. The symptoms are vastly different, not because of a diverse pathology, but simply and solely because of the difference in the function of the two organs. Since the nervous system furnishes the activating energy, which is absolutely essential to the functioning of all the other organs, naturally disturbances in its function would tend to disturb function in general through-

out the system. The result of this general disturbance in function is the production of toxins; toxins on the other hand, in themselves, affect function. Herein lies the so-called vicious circle, the best illustration of which is seen in functional nervous disturbances—a cause in one place produces an effect somewhere else, and the effect thus induced becomes the cause of another disturbance, and so on.

It is very difficult to consider toxic symptoms of nervous origin produced by the dysfunction of the thyroid alone, because the thyroid is so closely connected with so many other organs of the body where the abnormal function of one seems to depend to a large extent on the abnormal function of the other.

Stengel has expressed this relationship very aptly when he says that the more one studies the function of the thyroid, the more one realizes that its dysfunction is an algebraic sum of many morbid processes, some of which arise in the thyroid gland, others in the parathyroids, others in the pancreas or adrenals, or in the general metabolism of the liver itself. This statement of Stengel's is incomplete without the inclusion of the nervous system as one of the morbid processes.

The nerve supply of the thyroid is furnished by the vagus and cervical sympathetic. Both these nerves have other important functions in addition to their thyroid activity. Although they belong anatomically to the sympathetic nervous system in so far as function is concerned, they are in direct connection with the cerebrospinal system. Any disturbance in the one produces an effect in the other.

Cannon has observed in his experiments that stimulation of the vagus and cervical sympathetic nerves causes an increase in the thyroid secretion in from five to seven seconds. Recently C. Cerni* has reported that removal of the cortex of one cerebral lobe or of the surface of one cerebral hemisphere in dogs and birds causes pathological alterations in the thyroid gland itself. His conclusions from these experiments are that in vertebrates superior thyroid centers exist which are disseminated in the mass of the whole fore brain and in mammals over the entire cerebral cortex. These superior thyroid centers have a trophodynamic inhibitory function which acts in opposition to the accelerator function of the genetic centers by preventing an excessive function of the peripheral origin and by regulating

*Presented before the St. Paul Clinic Week Meeting, January, 1922.

*C. Cerni: "Brain and Thyroid Function," *Archives neurology and psychiatry*. Volume 6, No. 4, page 451.

the circulation and by maintaining, in normal degree, the trophic processes of the different thyroid elements, especially the parenchymatous ones. In other words, the brain regulates thyroid activity very much in the same way as the governor regulates the speed of a steam engine. The author points out that the results of these experiments call for a revision of many clinical problems, especially in neuro-psychiatry, in view of the present tendency to interpret any alteration of the thyroid gland as a cause rather than as an effect.

The action of brain tumors in causing disturbances of thyroid function is interesting in the light of Cerni's conclusions. In a recent number of *The Neurologische's Central Blatt*, a case of tumor of the brain cortex was reported where the chief symptoms were those of a myxedema. In my own experience, I can recall two very similar cases. In the first case, the absence in the beginning of either general or focal symptoms of a cerebral nature led to a provisional diagnosis of myxedema. In the other case, although symptoms of cerebral pressure were present, the myxedematous type of symptom characterized the clinical picture. In this case, the basal metabolism was a minus 25. Heretofore such symptoms had been attributed to pressure of the tumor on the pituitary gland, in this way producing an effect on the thyroid. Cerni's experiments suggest another and more plausible explanation.

The influence of the brain cortex on thyroid function is perhaps best observed in the nervous and emotional type of patient. Numerous cases are reported in the literature where Graves' disease developed suddenly as the result of an intense emotion. I can recall three such cases, all of which occurred in young women. In one case the patient started to walk across a railroad bridge and, when about half-way across, she saw a train coming. Another was attacked by a savage dog. The third was the result of a street car collision.

We observe the influence of cortical activity on the sympathetic nervous system in many ways. Under intense emotion the menstrual flow stops or starts. One person may break out in a cold perspiration. Another may become very nauseated—another symptom, by the way, of disturbed vagus function. In each case, as the result of the emotional state, a change in function occurs. In the interest of clearness and simplicity in our understanding of thyroid disturbances and their effect, the pity is that there are so many other subscribers

using the same line. If one of these others happens to put this line out of order, it is logical to presume that thyroid function will suffer also. The identification of symptoms which have their origin in thyroid pathology alone is no easy task.

There has been much discussion, as well as experimentation, as to the rôle which the thyroid plays in the etiology of the acute psychoses. The most we can say at present is that the thyroid is involved in the general disturbance. It has been said that, in the insane where hyperthyroidism is present, the mental condition is apt to express itself as one of exhilaration and mania; and with hypothyroidism, the reverse—depression and melancholia. My experience would not confirm any such general statement as this. At present I have under observation a young girl with typical symptoms of Graves' disease, yet her depression is the predominating one in the clinical picture.

What a *pot pourri* this whole subject is insofar as it touches the psychoses, both acute and chronic, is well shown in the "Dialysis Verfahren" of Faustner and Aberhalden. By this method, so-called protective ferments are present in the blood serum in the various types of psychopathic states and these protective ferments cause organ decomposition in differing ratios. For example, in 50 cases of psychopathic individuals whose blood serum was examined according to this method by Gottfried Ewald,* he reports his results as follows:

Brain decomposition	72%
Sex glands	72%
Thyroid	76%
Liver	36%

The reports of the other observers with this procedure are fairly uniform,—enough so at least to permit of the conclusion that in the blood serum of persons with psychic imbalance, there are what may be called anti-bodies which the sera of normal individuals does not contain and these anti-bodies cause the destruction or decomposition of organ tissue, the thyroid among such other organs as the brain and sex glands quite regularly being involved. The results of such methods of examination are interesting thus far only in that they serve to show us the actual participation of the thyroid in the causation of nervous and mental conditions. Like, however, the anti-bodies in the blood of syphilitics

*Gottfried Ewald: "Untersuchungen über fermentative Vorgänge in Verlaufe der endogenen Verblodungsprozesse," *Archive für Psychiatrie und Serumkrankheiten*. Bd. 60, Heft.

which cause the Wassermann reaction, their genesis remains as yet unexplained.

The number of mental cases in which a definite and positive hypothyroidism is present, according to the consensus of medical opinion, is somewhat rare. On the other hand, the percentage of such cases, which have what is called the non-toxic type of goiter, is remarkably large.

The following case illustrates quite well the complexity of the thyroid problem in its relation to the ordinary psychosis:

Miss N.: Referred by Dr. George Earl; age, 43; family history, not good; one sister insane.

Personal history: Peculiar from childhood; subject to moods and caprice; fits of very bad temper. The other members of the family rather stood in fear of her and let her have her way. Along with these qualities, she was very industrious and showed capacity in her occupation as a dressmaker. In 1912 was operated on for exophthalmic goiter, and had five-sixths of the gland removed. Her improvement was satisfactory. Tremor, tachycardia, etc., disappeared. Exophthalmos remained uninfluenced, as it usually does.

In 1916 she was operated on again because of a return of her old symptoms. This time again five-sixths of the gland was removed.

In 1919 the patient returned because of a tumor in her breast, which was diagnosed as a carcinoma, and the breast removed. With the exception of the exophthalmos, there were no other apparent symptoms of hyperthyroidism at this time. Sugar was found in the patient's urine as high as three per cent and an additional diagnosis of diabetic mellitus was made.

In August, 1921, the patient was returned to the hospital because of definite mental symptoms. At this time she was rather thin and emaciated. There was a generally diffused melanism of moderate degree. No thyroid tissue was palpable. Exophthalmos marked; sugar present in urine in varying quantities according to the rigidity of the diet. Pulse rapid but not more so than usual in the agitated mental case. Many of her mental symptoms were of the type found in patients with the so-called insanity of exophthalmic goiter. She changed suddenly from a catatonic state to one of violent outbreaks, manifesting extreme irritability and capriciousness. Her condition at present remains unchanged.

In the study of such a case, it becomes quite evident that the dysfunction of the thyroid is only one factor in a constitutional physical and psychic inadequacy. The emotional and unstable personality was constitutional. Furthermore, it is interesting to note that the severest expression of her physical and mental instability, namely, the diabetes and insanity, did not manifest themselves until a number of years after her hyperthyroidism was entirely

relieved; the diabetic symptoms appearing three years after her last goiter operation and the acute mental condition, five years. It is in the contemplation of such cases that one realizes the truth of Stengel's statement, that thyroid dysfunction is an algebraic sum of many morbid processes. The eccentricities of her early life, her moods, temper, capriciousness, were but manifestations of this fundamental inadequacy. Her emotional instability was the predominating factor. The thyroid dysfunction may be regarded as secondary and no doubt to a large extent caused by the unstable nervous condition.

Dèjerine has stated that exophthalmic goiter occurs in neuropathic families. He looks on exophthalmic goiter as a form of hereditary neurosis. In this connection, two cases suggest themselves. The one of the girl previously mentioned who suddenly developed a goiter and symptoms of hyperthyroidism over night, as the result of a fright caused by the collision of two street cars. The mother of this girl had a simple goiter, as also did a sister. An aunt, on the mother's side, had an exophthalmic goiter and died in a state institution for the insane. The mother, about a year after her daughter's shock, began to manifest delusions of persecution and inside of six months developed a pronounced dementia. She was then forty-six years old. Her symptoms, if the thyroid was a factor, resembled more those of a hypo rather than a hyper activity, but careful thyroid administration failed to make any improvement in her condition.

In another case under my observation at present, a girl of nineteen has typical symptoms of the exophthalmic type with thyroid enlargement and hyperactivity. However, these symptoms were not noticeable by her mother. The patient was brought to me because of severe depression. I had previously taken care of her mother, who had a simple goiter, in an attack of manic depressive insanity.

I cite these cases not as unusual happenings, but rather as frequent experiences in goiter patients, which indicates that the goiter, whether it be of the hypo or hyper type of activity, seems to be a factor. The absence of improvement from either partial removal of the gland in which hyper activity is suspected, or thyroid administration where the symptoms suggest the reverse in unusual patients, is good evidence that the thyroid function is only a part of a general maladjustment, and consequently that the fundamental etiological factors are to be sought

elsewhere. In many of our mental cases, especially those of the hebiphrenic type of dementia precox, it has been thought that hypothyroidism per se might be a factor, but the basal metabolism rate in such cases as we have had examined was found to be within normal limits and, moreover, thyroid feeding, even when gradually increased as high as 75 grains of the dried extract per day, produced no appreciable change in the patients' mental symptoms.

Exophthalmos, which one must admit is of frequent occurrence, occurs in 70 to 80 per cent of the cases of typical hyperthyroidism; the part the thyroid plays is still debatable. There remains the 20 or 30 per cent of also typical cases in which it is absent. It is the one symptom which is very apt to persist after thyroidectomy, although the other symptoms, such as the tachycardia, tremor, temperature, etc., have entirely disappeared. The cause of this bulbar protrusion at present is thought to be due to a stimulation of the cervical sympathetic. Recently* it has been suggested that the thymus gland had more to do with the causation of this particular symptom than the thyroid. Bircher experimentally produced in dogs tachycardia, nervousness, tremor and exophthalmos by the injection of thymus products into the peritoneal cavity. Crotti repeatedly found these symptoms developed moderately after thymus injections. In Friedleben's experiments after section of the sympatheticus, atrophy of the thyroid occurred. By analogy atrophy of the thyroid remnant, as found in myxedema, may inhibit the action of the cervical sympathetic. In my own observation, one of the most constant of the stigmata of a psychopathic state is a bulbar protrusion; to be sure not often to the degree in which it is found in Graves' disease, but, nevertheless, to the extent of being plainly recognizable, definite and positive. In these cases, von Graefe's sign is very often found, if it is sought.

There has been a good deal written recently about hyperthyroidism in the soldier, the kind with rapid pulse, cold hands and feet, hyperidrosis, the tendency to become exhausted easily, in short, the asthenic type. No doubt dysfunction of the thyroid is in some degree responsible for this condition, but the point I wish to make is that it is not the cause. The dysfunction here is only one of the

many morbid processes which, until we make further progress in our knowledge, we can only designate as stigmata of a constitutional neuropathic state. In such cases, the influence of the brain cortex is plainly shown. These individuals, under normal conditions where they are free from stress and strain, do very well, but just as soon as pressure is applied, their two nervous systems (cerebrospinal and autonomic) seem to become short circuited, as it were, and these symptoms are the result of a general dysfunction.

In one patient there are irritable vasomotors with tachycardia, some degree of bulbar protrusion, cold, discolored, sweating hands and feet even to the point in extreme cases of Raynaud's disease; in another, migraine and angio-neurotic edema; in still another, emotional disturbances with some or all of the above mentioned symptoms occupying the background. In one instance the etiology may be that of an infection either focal or general; in another, psychopathology entirely or a combination of both. In any case, the fundamental and predisposing cause must be regarded as a *sine qua non*. Such things do not occur in the normally adjusted individual.

After one has read the mass of contradiction as to the opinion in clinical experiences and, worse still, in animal experimentations in this field, his mind becomes filled with confusion and bewilderment. Only in a comparatively few cases are we at present able to make a fairly good adjustment as, notably, in thyroidectomy in selected cases of Graves' disease and thyroid administration in cretinism and myxedema. The great majority of these patients respond unfortunately thus far only by the methods of an indirect attack,—that is, by the exposure of the psychopathology, mental reconstruction, removal of focal infections, etc.

The thyroid problem is not one which concerns the thyroid gland alone, but, as was said in the beginning, represents an algebraic sum, which is never quite the same in any given case, but is made up of many morbid processes, produced by the general maladjustment.

The significance of thyroid enlargement then, in any patient, especially of the hyperthyroid type, is that of the stigma of a constitutional inadequacy. If you search for other stigmata of similar nature in these patients and their families, your efforts will not be in vain.

*G. A. Friedman: A brief discussion of the possible rôle of the thymus in Graves' disease and myxedema, New York Medical record, November 5, 1921, page 806.

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EDITORIAL

A. M. A. Meeting at St. Louis

The registration at the meeting of the American Medical Association in St. Louis, May 22 to 26, was 5,200, only three or four other sessions having had a larger registration. The first day of the House of Delegates was taken up with the addresses of the General Officers and Councils and the presentation of new business in the form of resolutions which were at once referred to the proper Reference Committees for future report and action by the House.

Several resolutions were misunderstood or willfully misused by the Press. One resolution in reference to the Volstead Act was stated to be an attack on said act. The resolution merely asked that the act be so amended that the government would furnish the druggist with sealed bottles in bond from the government distilleries (8 oz., 16 oz. and 32 oz.) so that physicians desiring to prescribe whiskey would be able to get pure goods. This was passed. A resolution condemning the assignment of vocational trainees from disabled soldiers to chiropractic schools also passed. A resolution in memoriam to Dr. J. N. McCormack, of Louisville, one of the reorganizers of the As-

sociation was passed. Also, later, a resolution to place a metal plate in some prominent place in the Association Building in memory of him was passed. A resolution to change the constitution so as to refuse the delegates from the different scientific sections voting privileges in the House of Delegates was presented. Under the rules this had to lay over one year. It was reported adversely by the Reference Committee and will be acted on by the next House. This was the basis for the newspaper report of a "split" in the House of Delegates.

The House of Delegates referred the question of a Legislative Bureau to the Board of Trustees. Such a bureau is being organized with a full-time paid secretary. It will attempt to co-operate with the Legislative Committees of the different states as to all legislation affecting medical men and to furnish information available for every one interested in such legislation. It will also have charge of all national legislative interest. It will undoubtedly give much needed service. There were numerous changes in the Constitution and By-Laws. Anyone interested can get a copy of the constitution by writing the Secretary of the American Medical Association, 535 North Dearborn Street, Chicago.

The social features were numerous. The President's reception was a brilliant affair, very crowded but every one seemed to enjoy it. A large ball followed. The ladies were taken care of in true southern style of hospitality.

Dr. Ray L. Wilbur, president of Stanford University, was elected President. San Francisco was chosen for the meeting place next year. The Trustees have since chosen the time from June 25 to 30, 1923.

A complete copy of the Proceedings of the House of Delegates may be found in the May 27th and June 3rd issues of the Journal of the American Medical Association.

T. McD.

Professor Fuchs

The recent visit of Professor Fuchs to Minnesota under the auspices of the Minnesota Academy of Ophthalmology was a source of great satisfaction to all who had the pleasure of seeing and hearing him. His visit was primarily for the purpose of holding a ten day post-graduate course for two hours each day for the benefit of the local special-

ists. A certain amount of consultation work was referred to him by specialists during his visit. The course consisted of lectures and demonstrations of lantern slides and those who took advantage of this unusual opportunity felt well repaid for time and money spent.

On the subject of pathology of the eye, Fuchs is an authority. Perhaps in no other branch of medicine does the name of one man stand out so pre-eminently as the authoritative source to which all present day investigators and writers must turn. And yet this venerable professor is the embodiment of modesty and simplicity and won all his hearers.

The lectures were accompanied by lantern slide demonstrations of specimens collected over a long and active lifetime. Certainly the unequalled opportunities in Vienna for studies of eye pathology have been carefully utilized to the utmost. The professor had an intimate acquaintance with his slides and lost no time in demonstrating facts with actual specimens.

The reception of Professor Fuchs in Minneapolis is a striking example of how truth in science and art should not and can not be suppressed even by such a catastrophe as the recent World War. Here was one scientific investigator handing on the results of his life work to other seekers after the truth and all else was of no importance.

Carbon-Monoxide Poisoning

There has been a notable disregard by the public in general and garage men in particular of the very grave danger from the inhalation of automobile exhaust fumes. The daily papers repeatedly report fatalities resulting from this sort of poisoning and Surgeon General Cummings of the United States Public Health Service has done a timely service in spreading a warning and information in regard to this form of poisoning which may be not only acute but chronic in character.

Automobile exhausts contain the products of incomplete combustion, most dangerous of which is the carbon-monoxide gas which ordinarily constitutes from five to seven per cent. The amount may increase to thirteen per cent in a badly running motor, and the closed garage, especially where cars are allowed to run continuously (so-called running-in), is likely to become a menace to health

and even life itself. A leaky heating system in a closed car which utilizes the exhaust has been known to cause fatalities.

Furnaces and stoves, through faulty drafts and leaky pipes, may allow the escape of carbon-monoxide, which in itself is odorless and accompanying odorous gases may not be detected, as the olfactory nerves upon repeated stimulation early lose their power to detect faint odors.

The danger lurking in illuminating gas is well known and in fact so well known that going to bed with the gas turned on has acquired some popularity among those suicidally inclined. The danger of accidental poisoning is less insidious, however, because of the accompanying odor of sulphur.

Carbon-monoxide is known to have a combining power with the hemoglobin of the red blood corpuscles some three hundred times that of oxygen. The inhalation of the poisonous gas, therefore, more or less readily replaces the oxygen and if allowed to act long enough results in the destruction of the red cells.

The symptoms of acute and chronic poisoning are largely a matter of degree. In the acute cases the victim may feel sleepy and yawn and there may be a sensation of the skin being tightly drawn across the forehead. Frontal headaches, later becoming occipital in character, may be followed by nausea, rapid pulse and respiration, and unconsciousness. Death may occur from heart failure. In the chronic cases the poisoning may produce a tired feeling, headache, nausea, palpitation, sleeplessness and mental dullness. A certain amount of immunity seems to develop in some cases and doubtless many chronic cases go unrecognized.

Oxygen will replace the combined carbon-monoxide in direct proportion to its concentration. Thus pure oxygen is five times as efficacious as fresh air. The earlier it is administered the less the likelihood of destruction of blood cells and for this reason oxygen should be at hand where there is likelihood of acute poisoning occurring. Artificial respiration may be necessary in extreme cases. Thus the apparatus for combining artificial respiration and oxygen administration is the ideal remedy. The importance of rest following such poisoning in order to minimize the danger of heart failure can not be over-emphasized.

OBITUARY

DR. H. E. CONLEY

Dr. H. E. Conley, a practicing physician in Cannon Falls for 37 years, died at his home there suddenly Saturday, May 27.

Dr. Conley was the son of Lewis and Betsey Hutchins Conley, early Iowa pioneers. He was born at Palo, Iowa, July 11, 1855. Later the family moved to a farm in Mitchell county near Osage, where Dr. Conley grew to manhood.

The study of medicine was taken up in 1881 with his brother, the late Dr. A. T. Conley, who was at that time practicing in Cannon Falls. He attended the full course of medicine at the Iowa Medical College and graduated from that institution in March, 1884. For a short time after graduation he practiced in Waterville but in 1885 he located permanently in Cannon Falls.

While devoting the greater part of his time to his profession Dr. Conley was prominent in political and educational circles of his town. He had acted as mayor and councilman and at the time of his death was president of the board of education.

Dr. Conley was held in high esteem not only by his fellow townsmen but by all who came to know him in a professional as well as a social way. He was known to all for his cheerful and agreeable disposition and for his high ideals.

Dr. James H. Proudlock of Danbury, Wisc., died at St. Luke's Hospital, Duluth, May 25, at the age of 59 years. Dr. Proudlock was a graduate of the College of Physicians and Surgeons, Keokuk, Iowa.

Dr. Elam S. Gibbs, Monticello, Minn., 75 years of age, died May 2. Dr. Gibbs gave up his practice ten years ago owing to illness. He was a graduate of Western Reserve Medical College.

Dr. Paul B. Magnuson of Chicago gave a moving picture demonstration of Bone Surgery followed by discussion by Dr. Henderson, Rochester, and Dr. C. N. Callander, Fargo.

The following papers were read:

Hypertension—Dr. E. L. Gardner, Minneapolis. Discussed by Dr. E. H. Smith, Bemidji, Dr. J. A. Freeborn, Fergus Falls.

Hypertension in Pregnancy—Dr. F. L. Adair, Minneapolis. Discussed by Dr. R. A. Beise, Brainerd, Dr. R. A. Gowdy, Alexandria.

Some Minor Disturbances of the Heart—Dr. Henry L. Ulrich, Minneapolis. Discussed by Dr. O. J. Hagen, Moorhead, Dr. C. F. Ewing, Wheaton.

X-Ray Therapy in Inoperable Malignancies—Dr. C. A. Donaldson, Minneapolis. Discussed by Dr. V. J. La Rose, Bismarck, Dr. Kent E. Darrow, Fargo.

Plastic Surgery of the Face in Civil Practice—Dr. Gordon B. New, Rochester. Discussed by Dr. E. W. Humphrey, Moorhead.

Head Injuries—Dr. F. J. Corbett, Minneapolis. Discussed by Dr. William Ott, Rochester, Dr. O. N. Meland, Warren.

Injuries of the Rectum—Dr. Theodor Bratrud, Warren. Discussed by Dr. H. C. Cooney, Princeton, Dr. B. J. Branton, Willmar.

Antrum Infection in Infancy and Childhood—Dr. Kenneth Phelps, Minneapolis. Discussed by Dr. C. G. Noradin, Brainerd, Dr. A. V. Garlock, Bemidji.

Acute Mastoiditis—Dr. Horace Newhart, Minneapolis. Discussed by Dr. Martin R. Rindlaub, Fargo.

Clinics were held by Dr. Nelson M. Percy and Dr. Bertram W. Sippy, both of Chicago. Other clinics were those conducted by Dr. C. N. Hensel, St. Paul, on Asthma and Hay Fever, and a Heart Clinic by Dr. F. J. Hirschboeck.

The following were elected as officers for the coming year: Dr. C. B. Lewis, St. Cloud, Minn., president; Dr. C. N. Callander, Fargo, N. D., vice-president; Dr. W. L. Burnap, Fergus Falls, Minn., secretary-treasurer; Dr. O. N. Meland, Warren, Minn., censor.

The next meeting of the society will be held at Alexandria in June, 1923.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

NORTHERN MINNESOTA MEDICAL ASSOCIATION MEETING

The Northern Minnesota Medical Association held its second annual meeting at Detroit, June 5, 6 and 7 with a large attendance. This society was organized a year ago for the purpose of getting together the physicians of the northern and western parts of the state and their adjacent territory. Members of the society feel that it promises to be one of the large societies of Minnesota.

Features of the meeting included a clinic for children under five years of age, conducted for the Becker County Public Health Association by Dr. H. F. Helmholz of Rochester and Dr. E. K. Huenekens of Minneapolis. A symposium on Tuberculosis in Children was composed of papers by Drs. H. F. Helmholz, Rochester; E. K. Huenekens, Minneapolis; O. W. Rowe, Duluth; M. S. Henderson, Rochester; and E. M. Hammes, St. Paul.

WABASHA COUNTY MEDICAL SOCIETY

The fifty-fourth annual meeting of the Wabasha County Medical Society will be held at Wabasha, Thursday, July 6th. The Society and guests, including the ladies, will be entertained by the Wabasha members and their wives.

Following is the program:

"The Modern Conception of Heart Disease," (President's address)—Dr. Hugo Branyan, Wabasha.

"Myodegeneration and Heart Disease of Later Life"—Dr. George E. Fahr, of the Teaching Department, School of Medicine, University of Minnesota.

"The Heart in Thyroid Toxemia"—Dr. John T. Bowers, Lake City.

"The Functional Heart Tests in Diagnosis and Prognosis"—Dr. D. S. Fleischhauer, Wabasha.

"The Present Status of Digitalis Therapy"—Dr. E. H. Bayley, Lake City.

SOUTHERN MINNESOTA MEDICAL ASSOCIATION

The midsummer meeting of the S. M. M. A. was held in Rochester, Monday and Tuesday, June 19 and 20, 1922. The long list of notable guests and the unexcelled clinical facilities of the Mayo Clinic contributed much to the success of the meeting. Although the attendance (under 300) did not come up to expectations, the various meetings were, for the most part, run off promptly and the ideal summer weather only added to the enthusiasm of the members.

The members began to arrive Sunday afternoon at the headquarters in the splendid new Kahler Hotel. With the seven new hotels completed within the past five years Rochester does not lack accommodations for meetings of any sort.

Symposii are becoming more and more popular at medical meetings and the one on thyroid diseases, given by members of the Mayo Clinic Monday morning, was both authoritative and interesting.

The poor acoustics of the Methodist church interfered somewhat with the value of the general meeting and it is fortunate that the addresses are to be published in MINNESOTA MEDICINE.

Perhaps we are led to expect too much new food for thought from the celebrities in the profession and therefore their remarks are often disappointing. This was true of this meeting to a certain extent and yet choice morsels were let fall occasionally, which made the meeting fully worth while.

At the evening banquet Dr. C. H. Mayo presided with his usual ease and paid tribute to the valuable services rendered the association by the retiring Secretary General, Dr. A. F. Schmitt. Dr. Fred H. Albee, of New York City, presented some figures in his address following the banquet, which gave some idea of the enormous army of workers that is incapacitated each year through industrial accident and illness and called attention to recent state legislation providing state aid for such unfortunates. He sounded a word of warning to the profession to prepare for the changes in the practice of medicine which are occurring at the present time, and which are demanding of the profession special study in order to be able to render efficient treatment.

No report of the meeting would be complete without calling attention to the unusually elaborate program presented and giving proper credit to the chairman of the program committee, Dr. H. W. Meyerding, of Rochester.

OF GENERAL INTEREST

The Minnesota Neurological Society met in Rochester, Saturday, May 13.

Dr. C. E. Wagner of Duluth recently moved to Morgantown, West Virginia.

Dr. H. H. Holm of Glencoe has filed for the office of coroner of McLeod county.

Dr. C. W. Tinker of Hutchinson recently returned from a winter's visit in California.

Dr. Roger H. Mattson of Minneapolis has begun the practice of medicine at Stephen, Minn.

Dr. and Mrs. W. C. Roberts, of Owatonna, have returned from a month's visit in Lincoln, Nebraska.

Dr. A. V. Denman, Mankato, is in New York taking post-graduate work in Medicine and Surgery.

Dr. H. R. Russell, formerly of Stewartville, has taken up his practice in Cherokee Heights, St. Paul.

Mrs. J. Raiter, mother of Dr. F. W. Raiter, of Cloquet, died a short time ago after a lingering illness.

Dr. S. O. Watkins has returned from Los Angeles, Calif., and will spend the summer at his home in Carlton.

Dr. H. A. Schneider of Jordan spent the month of June in California and other western points of interest.

Dr. H. A. Schneider of Jordan left June 10 for a three weeks' vacation in California and other western points.

Dr. and Mrs. J. L. Lynch and son of Winona recently returned home from a four months' stay in California.

Dr. C. M. Long has returned to his home in Osakis after spending three and a half months in southern California.

Dr. A. H. Kaplan, pathologist of St. John's Hospital, has been appointed as special instructor at Concordia College.

Dr. L. A. Buie was elected Associate Fellow of the American Proctologic Society at the recent meeting in St. Louis.

C. A. Portmann, nephew of Dr. Portmann of Jackson, has filed as candidate for representative from Murray county.

Dr. Alois Mahowald of Albany has located at Prior Lake where he is to continue the practice of the late Dr. E. E. Cannady.

Dr. J. J. Stratte of Minneapolis has given up his practice there and is considering Devils Lake, N. D., as a new location.

Fifteen nurses were graduated from St. John's Hospital, St. Paul, May 25. Exercises were held at St. John's Lutheran church.

Dr. E. R. Leonard, formerly of Everly, Iowa, has located in Lake Park, Iowa, for the practice of medicine and surgery.

Dr. Roy Andrews of Mankato is in Chicago taking a graduate course in pediatrics at Michael Reese Hospital under Dr. Abt.

Dr. and Mrs. E. L. Tuhoy, Duluth, sailed from Montreal May 19 to spend the summer touring the British Isles and the continent.

Announcement has been made of the marriage of Dr. O. J. Seifert and Mrs. Hedwig Henle, which took place in New Ulm May 15.

Dr. D. C. Balfour was elected vice-president of the American Surgical Association at the recent meeting held in Washington, D. C.

Dr. William G. Vandesteeg, formerly of Iowa Falls, Iowa, has moved to Biwabik, where he will be on the staff of the Biwabik hospital.

Dr. E. L. Doolittle has resigned as school physician of the Duluth Public Schools and will devote his entire time to his private practice.

Dr. J. P. Greaves of Sherwood, N. D., spent a week visiting with friends at Duluth while recuperating from an attack of influenza.

At the recent meeting of the Central Neuropsychiatric Association at St. Louis it was voted to hold the next meeting in Rochester, October, 1922.

Dr. E. W. Benham of Mankato, who recently returned

from an extended vacation in Florida, resumed his practice at the Mankato Clinic, June 15.

Dr. W. C. Dieterich of Hanley Falls recently completed a four weeks' course in post-graduate work at the University of Minnesota Medical School.

The Fourth Annual Meeting of the Association of Resident and Ex-Resident Physicians of the Mayo Clinic was held in Rochester May 29 and 30.

Dr. and Mrs. S. J. Kilbride returned to their home in Canby a short time ago from Chicago, where Dr. Kilbride has been taking post-graduate work.

Dr. J. J. Swendsen, a graduate of Rush Medical School in 1920, has moved from Appleton, Wis., to St. Paul, where he is associated with the Earl Clinic.

Dr. Thomas Hall Shastid of Duluth received, at the recent commencement of the University of Wisconsin, the honorary degree of Doctor of Science.

Dr. R. E. Farr, of Minneapolis, lectured in the lobby of the Mayo Clinic Thursday, May 11. His topic was "A discussion of the local anesthesia problem."

Dr. B. S. Gardner, of the Mayo Clinic, delivered the annual address to the graduating class of the Dental Department of the University of Minnesota.

Dr. P. C. Bjorneby of Bagley, who recently underwent a major operation at the Abbott hospital in Minneapolis, has been reported as recovering rapidly.

Dr. J. A. Rippert has resigned his position on the medical staff of the Missabe hospital at Proctor and will engage in private practice in West Duluth.

Dr. W. M. Gratiot of Mineral Point, Wisconsin, has sold his practice there to Dr. L. S. Graves of Wilton, Wisconsin. Dr. Gratiot plans to locate in California.

Word has been received of the marriage of Dr. Charles E. Proshek, of New Prague, Minn., to Miss Gabriel Preiss, of Prague, Czecho-Slovakia, at Prague, April 1.

Dr. W. A. Coventry, Potentate of Aad Temple, and Dr. C. L. Haney were among the Duluth delegation who attended the Shrine convention at San Francisco.

Professor Ernst Fuchs, of Vienna, gave a Mayo Foundation lecture at the Mayo Clinic June 9. His subject was, "Syphilis and its relation to diseases of the eye."

Dr. Hugh Reynolds, city health officer of Hibbing, recently completed a motor trip through the southern part of the state. Mrs. Reynolds accompanied the doctor.

Dr. Alfred N. Bessesen, Jr., and his brother, Dr. Daniel H. Bessesen, have entered into partnership with their father, Dr. A. N. Bessesen, at 301 Donaldson Bldg., Minneapolis.

Dr. E. H. Frost of Willmar, who for several weeks has been confined to bed at St. Mary's hospital, Minneapolis, is progressing very satisfactorily according to recent report.

Dr. J. R. Manley, Duluth, and Dr. R. M. Eppard, Cloquet, were speakers on the program of the St. Louis County Medical Society meeting which was held in Duluth last month.

An epidemic of appendicitis recently hit the Physicians and Surgeons Clinic of Duluth, as a result of which Drs. W. R. Bagley and E. Z. Shapiro are convalescing from operations.

A new appointment on the staff of the Minneapolis city hospital is that of Dr. H. P. Bacon of Milaca. Dr. Bacon has taken this position in addition to his duties in the government clinic.

The formal opening of the new Surgical Pavilion at St. Mary's Hospital in Rochester was held under the auspices of the ladies of the Rochester Child's Health Association, Friday, May 12.

At the last meeting of the St. Louis County Medical Society it was decided to hold the next meeting of the society on the Iron Range and to have the Range members give the program.

Dr. I. R. Maercklein, who has been associated for several years with Dr. E. M. Clay of Renville, recently moved to Oakes, N. D., where he and Mrs. Maercklein will make their future home.

Dr. J. N. Perkins has disposed of his medical practice in Sanborn and has removed to Lewiston, Idaho. His practice has been taken over by Dr. H. F. Juergens, formerly of Perham, Minn.

Dr. Wilson has recently been awarded the Distinguished Service Medal for exceptionally meritorious service to the government of the United States in a position of great responsibility during the World War.

Dr. A. J. Chesley, secretary of the State Board of Health, attended the conference which was called in Washington recently by the United States Public Health Service on the Shepherd-Towner maternity act.

Dr. H. Berglund, of the Department of Biochemistry, Harvard Medical School, gave a Mayo Foundation lecture in Rochester, June 1. His topic was, "The chemistry of the nonprotein nitrogen of the blood."

The Mississippi Valley Medical Association will meet in Rochester, October 10 to 12, 1922. Dr. Frank Kidd, of London Hospital, London, England, will present a paper, "The treatment of tumors of the bladder."

Dr. and Mrs. M. F. Eustermann of Rochester recently returned from Cambridge Springs, Pa., where Dr. Eustermann lectured before the Lake Erie District Dental Society on "The Relation of Dentistry to Medicine."

Leo P. Adams, son of Commissioner Julius Adams of St. Cloud has finished his studies at the University of Minnesota Medical School and will become intern at a La Crosse Wis., hospital before entering private practice.

Word has been received of the marriage of Dr. O. C. Strickler of New Ulm and Miss Carrie E. Purdy of Grand Rapids, Mich., which took place in Chicago, May 6. Dr. and Mrs. Strickler are now at home in New Ulm.

Dr. R. E. Farr and Dr. S. R. Maxeiner, who with their associates are now organized as the Surgical Clinic of Minneapolis, moved into their new suite of offices at the corner of Hennepin Avenue and Harmon Place, Minneapolis, July 1.

The West Central Minnesota Medical Society held their mid-year meeting at Ortonville on Big Stone Lake, June 15. Lunch was served at Ortonville, followed by an excursion up the lake to Foster, where the business meeting was held in the afternoon.

Dr. Wallace H. Cole of St. Paul has been selected as chief surgeon for the Shriners Hospital for Crippled Children, which will be located on East River Road, Minneapolis. Dr. Cole will assume his duties as soon as the hospital is completed in the fall.

Dr. C. A. Lester of Winona is confined to his bed with injuries sustained in an automobile accident when the taxi in which he was riding slipped off the road over an eight-

foot embankment recently. No fractures were sustained but he was quite badly bruised.

Dr. W. J. Foche, a graduate of the University of Illinois, has opened an office for general practice at Paynette, Wis. Dr. C. G. Amich, formerly of the University of Nebraska, will spend some time with relatives in Omaha before entering practice.

Dr. Walter H. Rumpf, who graduated from the Minnesota School of Medicine in June, will enter general practice immediately and will be associated with the Faribault Clinic at Faribault, Minn. Dr. Rumpf has completed his internship at the City Hospital in Minneapolis.

Dr. Thomas A. Lowe, Jr., formerly of Pipestone, has become associated with Drs. Leon A. Williams and Henry C. Doms of Slayton as associate physician and surgeon in the Home Hospital of Slayton. Dr. Lowe was associated with his uncle, Dr. Thomas Lowe, Sr., in his practice at Pipestone.

Several former residents of the City and County Hospital of St. Paul have located in Minnesota and neighboring states. Those who will practice in St. Paul are Dr. V. Hansen and Dr. G. Rubberg. The former will have his office with Dr. F. C. Schuldt, the latter with Dr. Arthur Sweeney.

Dr. A. E. Brown is to affiliate with Dr. W. R. Humphrey of Stillwater. Dr. C. E. Sisler will be associated with Dr. M. H. Hursh of Grand Rapids. Dr. L. C. Bacon, Jr., will take post-graduate work under Dr. G. W. Crile of Cleveland, beginning July 1.

Dr. Robert E. Farr of Minneapolis appeared before the Illinois State Medical Association at their meeting which was held at Chicago in May. At the invitation of Dr. A. A. McArthur of Chicago, Dr. Farr also attended the meeting of the Clinical Surgical Society at Chicago following the state convention.

Dr. Roy F. Raiter, brother of Dr. Franklin Raiter, of Cloquet, who was graduated last month from Northwest Union College in Chicago, will practice at the General Hospital, Cincinnati, Ohio, which is rated as the second largest hospital in the United States. Dr. Raiter goes to Cincinnati as the result of ranking highest in a competitive examination.

Dr. E. S. Mariette, superintendent of Glen Lake Sanatorium, was elected president of the Minnesota Association of Occupational Therapy at the organization meeting of the association at Hopkins last month. Miss Jessie Sauer of St. Paul was named first vice-president. Other officers are: Miss Julia Bradley, Fergus Falls, second vice-president; Miss Gracia Loehl, Glen Lake, secretary-treasurer.

Some criticism was brought to bear at a special meeting of the Watonwan County Medical Society recently on the fact that a member of the Hennepin County Medical Society had been in consultation with an osteopath in St. James. The matter was considered the more seriously owing to the fact that the Watonwan Society expelled one of its members last fall because of his close association with an osteopath.

The Minneapolis Surgical Society has been recently organized with a charter membership of twenty-four members. The conduct will be in the hands of a council of five. Only general surgeons who have fulfilled the minimum requirements of the American College of Surgeons

and who live in Minneapolis are eligible to membership. The first meeting was held on April 17th in the Minneapolis General Hospital under the following officers: R. C. Webb, President; Stanley R. Maxeiner, Vice President; A. A. Zierold, Secretary-Treasurer.

Dr. G. B. New was elected a member of the board of directors and vice-president of the American Laryngological, Rhinological, and Otolological Society at a recent meeting held in Washington, D. C. The next meeting of the middle section of the society will be held in Rochester, February, 1923.

"As assistant to the Director of Laboratories and Infectious Diseases, A. E. F., and by reason of his exceptional organizing and executive ability, he organized most efficiently a pathological service throughout the American Expeditionary Forces in France that was of inestimable value to the medical and surgical services and the knowledge thus made available resulted in the saving of many lives."

Dr. E. C. Hartley has been appointed full-time director of the division of child hygiene by the State Board of Health. Dr. Hartley's former home was in Carver, Minnesota. After graduating from Beloit in 1914 he received his M. D. degree at the University of Minnesota in 1918. Following his discharge from the army he had large administrative duties under the Red Cross in Poland. Of late he has been specializing in obstetrics and children's diseases, which experience has especially well prepared him for his new activities. He is at present with Drs. Polak and Beck at the Long Island Hospital at Brooklyn, New York.

MINNEAPOLIS DAILY CLINICAL BULLETIN

A clinical bulletin, including all hospitals, covering medicine and surgery in all its branches and specialties, is issued each day by the Hennepin County Medical Society for the information of local and visiting physicians.

You may arrange with the Hennepin County Medical Society, Geneva 6846, Donaldson Bldg., 11th Floor, to have these bulletins sent to your office, residence or hotel at a charge of fifteen cents per bulletin. You will be welcome at all of these clinics.

NEW AND NON-OFFICIAL REMEDIES

During April the following articles have been accepted by the Council on Pharmacy and Chemistry for inclusion in New and Non-official Remedies:

ABBOTT LABORATORIES:

Izal.

Izal Disinfectant Powder

INTRA PRODUCTS CO.:

Ven Sterile Solution Mercury Benzoate 1 C.C.

MERRELL-SOULE CO.:

Powdered Protein Milk-Merrell-Soule.

PARKE, DAVIS & CO.:

Pertussis Vaccine.

Pneumococcus Vaccine (4 Types).

Streptococcus Vaccine Polyvalent (Scarlatina).

Typhoid-Paratyphoid Vaccine (Prophylactic).

SEYDEL MANUFACTURING CO.:

Benzocaine-Seydel.

WINTHROP CHEMICAL CO.:

Iothion.

Iothion Oil.

Sabromin.

Sabromin Tablets, 8 Grains.

Acriflavine-Heyl—Proflavine-Heyl.—These products are now marketed by the National Aniline & Chemical Co. and the Council has continued the acceptance for New and Non-official Remedies under the new firm name.

Ammonium Ichthyolate-Meadows.—An aqueous solution, the important constituents of which are ammonium salts of indefinite, complex, organic acids, partaking of the nature of oxygenated bodies and sulphonates held in colloidal dispersion. It is derived from an oily distillate of a fossiliferous bitumen found in Texas. It is claimed that ammonium ichthyolate-Meadows has the therapeutic properties of ichthyol. (See New and Non-official Remedies, 1921, p. 344.) It is a reddish-brown, viscous fluid, having a faint odor. It is soluble in water and miscible with glycerine and fatty vehicles. Meadows Oil and Chemical Corporation, Durant, N. Y. (Jour. A. M. A., April 1, 1922, p. 967.)

Quinidine—Quinidina.—An alkaloid obtained from the bark of various species of Cinchona. Quinidine acts upon the heart in such a manner as to bring about cessation of fibrillation of the auricles in a certain proportion of instances. It is used to restore the normal rhythm of the heart in cases of auricular fibrillation. The drug is not without unpleasant and even dangerous effects. Cases of sudden death from its use have been reported. Quinidine is generally administered as quinidine sulphate. Two-tenths gm. is given as a preliminary dose. If no untoward effects result, the drug is administered on the following day in doses of from 0.2 to 0.4 gm., from three to five times a day and continued for from one to three days.

Quinidine-P. W. R.—A brand of quinidine-N. N. R. Powers-Weightman-Rosengarten Co., Philadelphia.

Quinidine-N. Y. Q.—A brand of quinidine-N. N. R. New York Quinine and Chemical Works, New York.

Quinidine-M. C. W.—A brand of quinidine-N. N. R. Mallinckrodt Chemical Works, St. Louis.

Quinidine Sulphate—Quinidinae Sulphas.—The sulphate of quinidine. For actions, uses and dosage, see under quinidine. It may be administered in the form of cachets, capsules, pills or tablets.

Quinidine Sulphate-P. W. R.—A brand of quinidine sulphate-N. N. R. Powers-Weightman-Rosengarten Co., Philadelphia.

Quinidine Sulphate-N. Y. Q.—A brand of quinidine-N. N. R. New York Quinine and Chemical Works, New York.

Quinidine Sulphate-M. C. W.—A brand of quinidine sulphate-N. N. R. Mallinckrodt Chemical Works, St. Louis, (Jour. A. M. A., April 8, 1922, p. 1051.)

Benzocaine-Seydel.—A brand of benzocaine-N. N. R.

(See New and Non-official Remedies, 1922, p. 39.) The Seydel Manufacturing Co., Jersey City, N. J.

Ven Sterile Solution Procaine 1 C.C.—Each ampule contains 1 c.c. of a 1 per cent solution of procaine-N. N. R. (See New and Non-official Remedies, 1922, p. 35.) Intra Products Co., Denver, Colo. (Jour. A. M. A., April 22, 1922, p. 1201.)

Ven Sterile Solution Mercury Benzoate 1 C.C.—Each c.c. contains mercuric benzoate, 0.02 gm. ($\frac{1}{3}$ Grain). (See New and Non-official Remedies, 1922, p. 192.) Intra Products Co., Denver, Colo.

Tablets of Mercurochrome-220 Soluble.—Each contains 4.6 grains. (See New and Non-official Remedies, 1922, p. 187.) (Jour. A. M. A., April 29, 1922, p. 1296.)

Sterile Suspension Mercury Salicylate in Cacao Butter 1 C.C.—Each c.c. contains .097 gm. ($1\frac{1}{2}$ grains) of mercuric salicylate. (See New and Non-official Remedies, 1922, p. 193.) Intra Products Co., Denver, Colo.

Sterile Suspension Mercury Salicylate in Olive Oil 1 C.C.—Each c.c. contains 0.097 gm. ($1\frac{1}{2}$ grains) of mercuric salicylate (See New and Non-official Remedies, 1922, p. 193). Intra Products Co., Denver, Colo. (Jour. A. M. A., April 29, 1922, p. 1296.)

PROPAGANDA FOR REFORM.

"Premedicated" Alcohol.—A petition to permit the use of so-called "premedicated" alcohol in remedies for internal use has recently been placed before the Secretary of the Treasury and the prohibition officials. According to drug journals, such a petition was presented by the Council for the Proprietary Association—the organization of the "patent medicine" interests—and also by the Chattanooga Medicine Company—the makers of "Wine of Cardui." When thus medicated, the alcohol is to be tax free. This proposition contains dangers to medicine and to pharmacy in that it may render scientific control of such medicaments difficult. (Jour. A. M. A., April 1, 1922, p. 970.)

Nephritin, Peptenzyme, Trophonine and Pancrobilin.—Sometimes the results of the application of the esthetic arts to commercial interests is incongruous. A house organ uses the names of famous writers, presumably to attract attention. Thus: It is suggested that if the physicians to Montaigne, who died of nephritis, had known of "Nephritin" they would have been able to furnish him with "substantial constructive help"—a statement which may be more readily accepted by litterateurs than by pathologists. Since all of us cannot live the simple life recommended by Joaquin Miller, as a means of avoiding indigestion, it is inferred that we must depend on Peptenzyme. It is related that Thomas Hood passed away in spite of soups and other nourishing food prepared for him by his wife. "Therefore," says the advertiser, "use Trophonine and live." "Like Victor Hugo," proclaims the advertiser, "millions today are eating the unknown and are paying the toll in constipation." He further asserts, "From whatever cause it originates . . . Pancrobilin is always indicated." Alas, Nephritin, Peptenzyme, Trophonine and Pan-

crobinil cannot avail Montaigne, Miller, Hood or Ilugo now. (Jour. A. M. A., April 1, 1922, p. 971.)

Leaven's Asthma Prescription.—This is put on the market by the Leavenwood Drug Co., Rosedale, Kansas. The A. M. A. Chemical Laboratory reports that the composition of this preparation is essentially: Potassium iodide, 10.9 gm., sugar (sucrose) 55.0 gm., iron, a trace, water, flavoring and coloring matter to make 100 c.c. (Jour. A. M. A., April 1, 1922, p. 991.)

Eksip.—This is a mail-order "cure" for diabetes, marketed by Matthew Richartz with the slogan, "No more dieting! No more starving! 'Eat and get well.'" Eksip is sold in the form of tablets at 6.00 for 200. The A. M. A. Chemical Laboratory reports that the bulk of the tablets consisted of magnesium carbonate and starch. A small quantity of an unidentified drug was found. Alkaloid heavy metals and emodin-bearing drugs were absent. (Jour. A. M. A., April 1, 1922, p. 991.)

"Proprietary Preparations in Poland."—The influence of the work of the American Medical Association—through its Council on Pharmacy and Chemistry and The Journal's Propaganda for Reform in Proprietary Medicines—in protecting the public, both directly and indirectly, against the nostrum evil, extends year by year. Especially, is it noticeable when new legislation is created. Recently, the new Polish state introduced regulations governing the manufacture and sale of proprietary remedies. These regulations reflect the change in attitude that has taken place in the public mind in all civilized communities toward the responsibility of those who would make and sell preparations of the home remedy type. The Polish regulations have much in common with recent Austrian and Spanish legislation on proprietary medicines, and the influence of the English Proprietary Medicines Bill is apparent in the prohibition of the use of testimonials. While no quantitative disclosure on the label of the composition of the preparation is required, except in the case of potent drugs, the fullest details are demanded from the manufacturer, this information to be of such a nature as will enable the State Pharmaceutical Institute to prepare the preparation for the purpose of verifying the manufacturer's statements. The obligation of the manufacturer to keep a record not only of his production, but of all his supplies to wholesalers, is also a new feature. (Jour. A. M. A., April 8, 1922, p. 1071.)

Yeast Foam Tablets.—Shorn of verbiage, "Yeast Foam Tablets" are claimed to be dried yeast in the form of tablets. They are put up in typical "patent medicine" style. The advertising for these tablets would lead the public to believe that it is in imminent danger of suffering from an inadequate supply of vitamin B. Though the Yeast Foam propaganda is plainly addressed to the public, specimen packages have been sent to physicians. Thus, the profession is given once more the opportunity to act as an unpaid peddler. (Jour. A. M. A., April 8, 1922, p. 1074.)

Hormotone.—This is a "pluriglandular tonic for asthenic conditions," sold by the G. W. Carnick Co. in the form of tablets for oral administration. Each tablet is said to contain 1/10 grain of desiccated thyroid, 1/10 grain of entire pituitary, together with the hormones of the ovary and testes—the amount and the form in which the latter are

supposed to be present are not given. The Council on Pharmacy and Chemistry refused to accept Hormotone for New and Non-official Remedies. (Jour. A. M. A., April 8, 1922, p. 1074.)

Queen of Antiseptics.—This preparation is marketed by a person in Aurora, Illinois, calling herself "Mme. Leonard." It is claimed to be "A Perfect Vaginal Germ Destroying Powder and Applicator." The A. M. A. Chemical Laboratory reports that the preparation is composed essentially of boric acid, 97 per cent, and ammoniated mercury, 3 per cent. (Jour. A. M. A., April 8, 1922, p. 1072.)

Yeast Preparations and Vitamin B Concentrates.—The Council on Pharmacy and Chemistry has adopted the following principles as a guide in the consideration of yeast preparations and vitamin B concentrates for New and Non-official Remedies: 1. The claim that deficiency of vitamin B and diseases resulting therefrom are common conditions in the United States is not at this time warranted. 2. The claim that yeast preparations or extracts are, in principle or in general, essentially more effective or more practical or a more available means of administering vitamins than the commonly available vitamin-containing foods is not at this time supported by adequate acceptable evidence. 3. The claim that therapy with yeast or yeast preparations has as yet more than an experimental status is not at this time supported by adequate acceptable evidence. (Jour. A. M. A., April 15, 1922, p. 1146.)

During May the following articles have been accepted by the Council on Pharmacy and Chemistry for inclusion in New and Non-official Remedies:

G. W. CARNICK CO.:

Epinephrine-G. W. C. Co.

Epinephrine Chlorid solution-G. W. C. Co.

INTRA PRODUCTS CO.:

Phenolsulphonephthalein-Ipco.

Vensterile Solution Phenolsulphonephthalein, 1 c.c.

LEDERLE ANTITOXIN LABORATORIES:

Pollen Diagnostics-Lederle.

H. K. MULFORD CO.:

Diphtheria Toxin-Antitoxin Mixture-Mulford.

NATIONAL ANILINE AND CHEMICAL WORKS:

Neutral Acriflavine-Heyl.

Tablets Neutral Acriflavine-Heyl. 0.1 gm. (1½ grs.)

Neutral Acriflavine-Heyl Throat Tablets.

Neutral Acriflavine-Heyl "Pro Injectione," 0.5 gm. vials.

Neutral Acriflavine-Heyl "Pro Injectione," 1.0 gm. vials.

WINTHROP CHEMICAL CO.:

Luminal Tablets, ¼ grain.

Izal.—An albuminous emulsion containing not less than 50 per cent of "izal oil," obtained in the destruction of bituminous coal, and consists essentially of monatomic phenols boiling between 205 and 300 C. Izal is practically free from phenol and cresols. Izal is a germicide and disinfectant. The germicidal efficiency is claimed to be twelve times as great as that of any equal quantity of phenol, but it is stated to be less toxic than phenol. The Abbott Laboratories, Chicago.

Izal Disinfectant Powder.—Izal oil, 10 per cent; naph-

thalene, 5 per cent; inert, absorbent earth, 85 per cent. The Abbott Laboratories, Chicago.

Powdered Protein Milk—Merrell-Soule—Dry Protein Milk.—A modified milk preparation having a relatively high protein content and a relatively low carbohydrate content. Each 100 gm. contains approximately: Protein, 38 gm.; butterfat, 27 gm.; free lactic acid, 3 gm.; lactose, 24 gm., and ash, 5 gm. Powdered protein milk is said to be useful for correcting intestinal disorders of infants and children. For the majority of conditions, powdered protein milk should be administered in small quantities, according to the age and condition of the patient, after a period of starvation of from twelve to forty-eight hours. Merrell-Soule Sales Corp., Syracuse, N. Y.

Sabromin—Calbromen—Calcium Dibromobenate.—Sabromin contains not less than 28.5 per cent of bromine. Sabromin is not adapted to conditions in which a rapid saturation of the system with bromine is required. It is indicated in conditions in which the bromides cannot be administered for continued periods without gastric disturbance or in which brominism is caused readily. It is claimed that sabromin is of value in conditions in which a mild sedative action is desired, particularly in conditions requiring prolonged administration. Dosage: From 0.3 to 1.2 gm. Winthrop Chemical Co., Inc., New York. (Jour. A. M. A., May 6, 1922, p. 1389.) Sabromin tablets, 8 grains. Winthrop Chemical Company, Inc. (Jour. A. M. A., May 6, 1922, p. 1389.)

Iothion—Iopropane—Di-Iodo-Hydrox-Propane.—Iothion contains from 77 to 80 per cent of iodine. It is used when it is desired to obtain the systemic effect of iodides by external application. Iothion is used in the form of iothion oil, in solution in alcohol or glycerine, or in the form of ointments containing from 5 to 20 per cent of iothion. Winthrop Chemical Company, Inc., New York. (Jour. A. M. A., May 13, 1922, p. 1459.)

Iothion Oil.—Iothion, 10 parts; chloroform, 10 parts; olive oil, 80 parts. Winthrop Chemical Company, Inc., New York. (Jour. A. M. A., May 13, 1922, p. 1459.)

Typhoid-Paratyphoid Vaccine (Prophylactic) (See New and Non-official Remedies, 1922; p. 310).—A typhoid vaccine marketed in packages of three 1 c.c. bulbs, the first dose containing 500 million killed typhoid bacteria, 375 million killed paratyphoid A and 375 million killed paratyphoid B bacteria; the second and third doses each containing 1,000 million killed typhoid bacteria, 750 million killed paratyphoid B bacteria respectively. Parke, Davis & Co., Detroit, Mich.

Pneumococcus Vaccine (4 Types) (See New and Non-official Remedies, 1922, p. 304).—A suspension of pneumococci, Types I, II, III and Group IV, in equal proportions, in physiological solution of sodium chloride, preserved with cresol, 0.3 per cent. Each cubic centimeter contains 3,000 million killed bacteria. Marketed in packages of four 1 c.c. bulbs; four 1 c.c. syringes; 5 c.c. vials and 20 c.c. vials, respectively. Parke, Davis & Co., Detroit, Mich.

Streptococcus Vaccine Polyvalent (Scarlatina).—A streptococcus vaccine (See New and Non-official Remedies, 1922, p. 308), marketed in packages of four 1 c.c. bulbs, each cubic centimeter containing 1,000 million killed streptococci isolated from scarlatina cases; also marketed in

packages of 4 c.c. syringes, in 5 c.c. vials and in 20 c.c. vials. Parke, Davis & Co., Detroit, Mich.

Pertussis Vaccine.—A pertussis bacillus vaccine (See New and Non-official Remedies, 1922, p. 303), marketed in packages of four 1 c.c. bulbs, each cubic centimeter containing 4,000 million killed pertussis bacilli (Bordet); also marketed in packages of four 1 c.c. syringes, in 5 c.c. vials and 20 c.c. vials. Parke, Davis & Co., Detroit, Mich. (Jour. A. M. A., May 13, 1922, p. 1459.)

Diphtheria Toxin-Antitoxin Mixture—Mulford.—Each c.c. of this mixture (See New and Non-official Remedies, 1922, p. 282) constitutes a single dose containing three lethal doses of toxin and 3.5 units of antitoxin. It is marketed in packages of three 1 c.c. vials; in packages of thirty 1 c.c. vials, and in packages of one 10 c.c. vial. H. K. Mulford Co., Philadelphia.

Phenolsulphonephthalein-Ipco.—A brand of phenolsulphonephthalein-N. N. R. (See New and Non-official Remedies, 1922, p. 222.) It is marketed in the form of Vensterile solution phenolsulphonephthalein, 1 c.c. representing phenolsulphonephthalein-Ipco 0.006 gm. in the form of the monosodium salt. Intra Products Co., Denver. (Jour. A. M. A., May 23, 1922, p. 1612.)

PROPAGANDA FOR REFORM

MORE MISBRANDED NOSTRUMS.—The following products have been the subject of prosecution by the Federal authorities charged with the enforcement of the Food and Drugs Act:

Iron Elixir (Charles S. Miller), a dilute watery solution of sodium citrate and iron chlorid, with a slight trace of alcohol, sold as a cure for pimples and boils and as a blood purifier.

Vegetable Regulator (Charles S. Miller), an alkaline watery solution containing aloes and baking soda, claimed to be a remedy and cure for diseases of the liver, diseases pertaining to the stomach and bowels.

Diuretine (East India Medicine Co.), consisting of potassium acetate, buchu extract, a laxative plant drug, oil of juniper berries, sugar, alcohol and water and represented as a cure for Bright's disease and other conditions.

Bloodzone (East India Medicine Co.), consisting of extractives of plant drugs, including a laxative drug, sugar, alcohol and water and represented as a cure for syphilis, cancer, rheumatism, catarrh, boils, psoriasis, pimples and many other conditions.

Grantillas (Eneglotaria Medicine Co.), containing emodin-bearing plant extractives and cramp bark and claimed to be "the best existing uterine tonic," a first class general tonic in anemia and chlorosis and a cure for "Hysteria."

Winslow's Sarsaparilla Compound (Howard Drug and Medicine Co.), consisting essentially of extract of plant material, including sarsaparilla, potassium iodid, glycerin, alcohol and water and claimed to be a reliable remedy for scrofula, chronic ulcers, syphilitic affections, etc. (Jour. A. M. A., May 6, 1922, p. 1407.)

MORE MISBRANDED NOSTRUMS.—The following products have been the subject of prosecution by the Federal authorities charged with the enforcement of the Food and Drugs Act, chiefly because the therapeutic claims made for them were unwarranted:

Compound Fluid Balmwort (The Blackburn Products

Co.), consisting essentially of plant extractives, including bear-berry, a large proportion of sodium acetate, alcohol and water.

Whitlock's Child's Laxative, Cough Sirup, Cathartic Sirup, Nervine Pills, Blood Pills, Female Cordial, Kidney and Gravel Medicine, Red Indian Liniment, Worm Cordial, Nerve Pills, Rheumatic Pills, Kidney Pills (Whitlock Herb Medicine Co.). (Jour. A. M. A., May 20, 1922, p. 1556.)

PROCEEDINGS OF THE MINNESOTA ACADEMY OF MEDICINE

Meeting of April 19, 1922

DR. ARCHA WILCOX presented the following case:

Mrs. C. O., married, age 55 years, first seen December 29, 1921.

Family history: Negative.

Past history: In bed six weeks with "pericarditis"—had chills and fever. Pleurisy, chest aspirated, 30 years ago. Constipated for years.

Present complaint: Pain in abdomen, vomiting, distention, bloody vaginal discharge, loss of weight and inability to get bowel movement.

Onset and course: Has been passing through the menopause during the last year. Did not flow for 3 or 4 months, then in April, 1921, began to have bloody discharge from vagina with clots for 3 to 5 days. Then passed no blood for about 3 months. Ever since this she has been unable to retain any solid food and was afraid to eat, as she might vomit immediately or perhaps an hour later. Has been under another doctor's care and was told she had a tumor of the womb. Was given 8 or 10 vaginal radium treatments. Loss of weight and strength has continued. Pain in left side all summer.

Christmas Eve, was awakened by severe pain in right side of abdomen, vomited immediately and vomiting has continued the past three days, occurring frequently. Vomitus is pale, much mucus, no blood or fecal material. No bowel movement for three days until today—slight fecal material (without enema). No blood noted in stools. Pain is located in right lower quadrant extending towards navel; is dull and heavy in character and present continuously. At times more severe than at other times. Vomiting relieved pain slightly. Distention of abdomen not marked. Frequent urination since April, 1921; 4 or 5 times at night; some urgency. No dysuria or incontinence. Urine appears cloudy and analysis during the summer showed albumen and pus. No blood noted. Some edema of feet following an eruption several weeks ago on legs and arms. Thinks she had no fever.

Examination: Poorly nourished. Does not appear acutely ill. Temperature 98.6; pulse 88. Eyes, ears, nose and throat negative. Also neck, chest and lungs. Heart shows slight roughening at first tone at apex.

Abdomen: There is a mass in region of right kidney extending anteriorly, which is firm, moves with respiration, moderately tender, no fluid, rigidity or other abnormalities noted. Bowel seems to be in front of mass.

Vaginal: Urethra appears normal; cervix multiparous, body very small, retroverted. Adnexa not palpated.

Extremities covered with papules whose tops are scratched off. Knee jerks plus.

Sent to St. Mary's hospital Dec. 29, 1921. On December 30, w. b. c. 14,000. Catheterized specimen of urine loaded with pus.

January 9, 1922, first pyelogram showed twisted ureter and a floating kidney with hydronephrosis. Ureter dilated about twice its normal width.

Diagnosis: Hydronephrosis of right kidney—cause undetermined. Left kidney could not be distended with sodium bromide solution at this time.

Cystoscopy same date by Dr. G. Thomas showed much pus in urine. Bladder appeared quite normal. Right ureteral orifice appeared normal and left was gaping, reddened and pus could be seen oozing from it, especially when left loin was squeezed. Specimens collected from the ureters showed:

Right: Urine clear—no pus, t. b. bacilli or other bacteria found.

Left: Much pus, urine cloudy; no t. b. bacilli or other bacteria found after careful search. Indigo carmine injected intravenously appeared through the right ureter in 3½ minutes and none came through the left in 20 minutes. Pyelograms showed shadow having appearance of polycystic kidney. Cystoscopy indicated a dead left kidney. Before operation gastro-intestinal tract x-rayed and found to be normal.

Operation: On January 22, 1922, under local anesthesia left kidney was removed. It was found to be large, very adherent, and some difficulty was experienced in its removal until the capsule was opened and kidney removed and capsule then removed.

Following this operation the patient did very well. Had no nausea or vomiting and on February 18, 1922, the right kidney was fastened in place by splitting the capsule and attaching it with silk worm sutures, which were later removed. The incision on the right side healed by first intention, and left side did almost exactly the same. There was, however, a small sinus which persisted and is still present. Recovery from both operations uneventful.

March 6, 1922, patient up and around and is gaining in strength. Leaving hospital. A specimen of urine examined since patient went home showed t. b. bacilli present.

DR. A. E. BENJAMIN presented a case of osteomyelitis with x-ray films.

B. B., age 13, F., student.

Complaint: Osteomyelitis of tibia and first metatarsal bone.

Family history: Negative.

Personal history: Has had tonsillitis several times. Lungs and heart negative. Appetite and bowels good as a rule. Kidneys negative. Taken sick January 4th with tonsillitis; in bed with high temperature. Feet and legs became swollen and very painful. Diagnosis by attending physician "inflammatory rheumatism." About February 25th, right leg was lanced superficially at the junction of the middle and lower third. Left foot broke open later and discharged pus. In bed since January 4th. Was called in consultation March 15th.

Physical examination: Tonsils large but not submerged. Discharging sinus from dorsal and inner side of left foot and discharging sinus from lower anterior surface of right

leg with considerable swelling. Urine normal. White count 18,000.

X-ray: Anterior, posterior and lateral plates made of left foot and right leg. Shows osteomyelitis involving lower one-third of the right tibia. There is a marked periosteal proliferation. Several small sequestra. Destruction with abscess formation. Osteomyelitis involving first metatarsal of left foot. Involvement of shaft is near proximal epiphysis. Marked periosteal proliferation of entire shaft.

Diagnosis: Osteomyelitis.

Operation: March 17th, sinus in 1st metatarsal in left foot, curetted, carbolyzed and packed with iodoform gauze. Two-inch incision over anterior surface of tibia in right leg and five-inch incision over medial surface of tibia. Small portion of bone chiseled out and sequestra removed. Cavity curetted and packed with iodoform gauze. Left hospital April 13th.

Specimen: No evidence of t. b. found.

Comment:

1. Evidently osteomyelitis resulting from focal infection.
2. Occurred in more than one bone at same time.
3. Diagnosed "rheumatism" by attending physician.
4. Considered simple abscess later.
5. Destruction of bone very rapid.
6. Cavity and dead bone thoroughly removed and infection destroyed. Iodoform packing with no resulting discharge, since operation, excepting serum.
7. Temperature normal; also pulse.
8. Most of gauze left in cavity until April 11th, as it did not separate from bone until that time. Bismuth paste used as filling afterwards.

Results: Healing perfect in left foot at present time. Right leg rapidly healing and promises good results.

DR. W. A. DENNIS reported a case of dermoid cyst of the pancreas.

The patient is a man, married, 38 years of age, driver of a delivery wagon. He had been under treatment elsewhere for two years for rheumatism and for sacro-iliac disease because of pain in the right costo-lumbar region. He had had scarlet fever, diphtheria, and some decayed teeth. At the time he consulted us he complained only of an indefinite discomfort in the right costo-lumbar region.

Examination revealed a mass, mostly on the right side, below the liver, and in intimate relation with it. It was about 15 cm. in length and 10 or 12 in breadth. It did not move with respiration and was only slightly sensitive to pressure. This was the only pathology found. Urine was normal, blood pressure normal, and Wassermann negative.

The diagnosis took into consideration a tumor of the kidney, echinococcus cyst of the liver, and a tumor of retroperitoneal origin. The accompanying x-ray shows very definitely the outlines and size of the tumor, and fluoroscopic examination indicated that the course of the duodenum was in front of the mass. This, together with the pyelogram showing a normal right kidney pelvis, probably should have definitely fixed the diagnosis as a tumor of retroperitoneal origin.

Incision was made in the midline from the ensiform to the umbilicus. The tumor mass was found to lie behind the stomach and duodenum and was explored through an opening in the gastrohepatic omentum. It was not exposed

until the posterior peritoneum had been incised, when pancreatic tissue was disclosed. The mass was explored also from the outer side of the duodenum and from beneath the upturned colon. In both localities the same pancreatic tissue was to be seen, and since neither offered as great accessibility as the opening through the gastrohepatic omentum this route was chosen and the posterior peritoneum sutured to the parietal peritoneum. The pancreatic tissue was then incised and found to be about $\frac{1}{4}$ inch in thickness. This disclosed a cyst wall of some consistency. On account of the relations enucleation appeared to be out of the question. The cyst evidently arose from the pancreas. Its posterior wall rested upon the aorta and vena cava, its left margin on the common duct and portal vein, and its anterior surface displaced to the right and forward the superior mesenteric vessels. The wall was therefore opened and its contents found to consist of the grumous, greasy, putty-like constituents of a dermoid cyst. A number of short hairs were found in the contents. The sac was emptied so far as possible and a large rubber tube was inserted. The operation was done on the 16th of February and the sac is still discharging, although considerably reduced in size, as the accompanying x-ray shows. The irritation of the skin of the abdomen is that characteristically produced by the pancreatic ferments. The man's general condition is very good and he has an enormous appetite, although for several weeks after the operation he lost weight.

So far as I have been able to discover, only one other case of dermoid cyst of the pancreas has been reported and this by Dr. Judd of Rochester. In his case the tumor was in the tail of the pancreas and could not be removed in its entirety without opening. The ordinary cyst of the

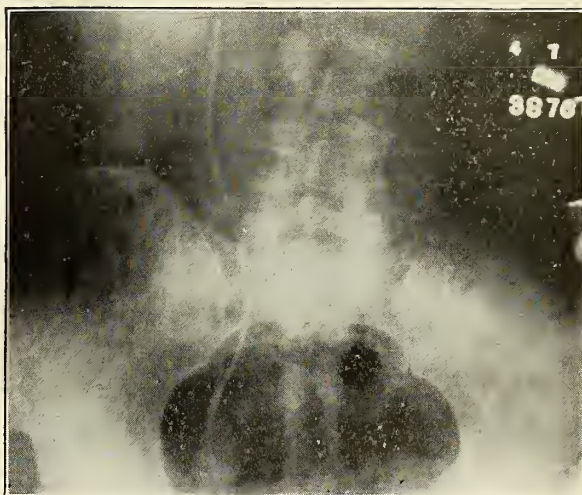


Fig. 1. A387672. Outline of one dilated ureter and the lead catheter in the other are seen in close proximity in lower portion.

pancreas eventually recovers with simple drainage, but whether a dermoid cyst will close with simple drainage remains to be seen. We are endeavoring to destroy the lining membrane of the cyst wall by occasional irrigation with Zenker's fluid. The discharge of late is greatly decreased in amount and is decidedly more serous in character so the outlook appears hopeful.

DR. W. F. BRAASCH, of Rochester, reported the following cases:

CASE 1. Duplication of the renal pelvis and ureter. A387672. Mr. C. F. P., aged 28 years, came to the Mayo Clinic March 29, 1922, complaining of pain referred to the area of the bladder and the right loin, pyuria, and urinary frequency. The symptoms had appeared seven years before with chills and fever, pyuria and urethritis.

Physical examination was practically negative. The specific gravity of the urine was 1.020; it contained a trace of albumin, and 60 pus cells to a field. Culture of the urine revealed colon bacilli. Smears from the prostatic and urethral secretions were negative for gonococci. Rectal examination revealed slight chronic prostatitis. The blood urea was 36 mg. for each 100 c.c. of blood. Roentgenograms of the urinary tract and the Wassermann test on the blood were negative. Cystoscopic examination revealed a moderate degree of diffuse cystitis. The left ureteral orifice was normal. Two orifices less than 1 cm. apart were found on the right side of the trigone. The median or lower orifice was normal; the lateral was dilated, being fully 1 cm. in diameter. (Fig. 1.) Turbid urine exuded on pressure. Catheters were introduced into both ureters to a normal length. The pyelogram revealed definite duplication of the pelvis—the upper normal although small; the lower irregularly dilated. (Fig 2.) The catheterized urine from the upper pelvis was normal; that from the lower pelvis contained many pus cells. The differential phenolsulphonephthalein test showed, in 15 minutes, on the right side a 10 per cent return of the dye from the upper pelvis and only a trace from the lower; and on the left side, a 15 per cent return in 15 minutes.

Diagnosis was made of complete duplication of the right renal pelvis and ureter, with infected hydronephrosis and atrophy of the lower segment, and normal upper segment. Exploration was advised with a view to heminephrectomy if possible.

At operation the diagnosis was corroborated. The entire



Fig. 2. A387672. Complete duplication of pelvis and ureter. Note close proximity of the two pelvis. Moderate dilatation of the lower pelvis.

kidney, however, was smaller than normal. There was no evidence of external demarcation of the two segments. For a distance of about 10 cm. above the bladder the two ureters were intimately related and covered by a common sheath. (Fig. 3.) It was impossible to separate them, and so it was necessary to perform a complete nephro-ureterectomy. After removal, the two ureters were found to be so adherent that it was impossible to dissect them apart without opening them. On section of the kidney the two pelvis were found to be so closely adjacent that heminephrectomy would have been difficult.

CASE 2. Papillary epithelioma of the renal pelvis. A 383327. Mr. H. M. H., aged 48 years, came to the Clinic February 6, 1922, complaining of painless hematuria of one year's duration. He had had malaria in 1890,

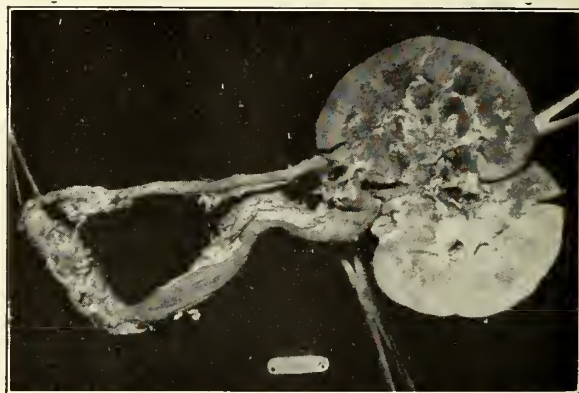


Fig. 3. A387672. Complete duplication of ureter; lower portion of ureters in common sheath which could not be divided without opening either ureter.

pneumonia with influenza in 1918, gonorrhea at twenty-four and again at twenty-eight years. After receiving a hard push in the back the patient had had rather sharp pain in the right loin for two or three days. He then first noticed blood in his urine, and it has since been practically constantly present. He had not had colic, and had not suffered from frequency or dysuria. Loss of weight was not noticed, but for three weeks before examination he had not worked because of progressive weakness. Cystoscopy had been done elsewhere one year before and a cauliflower growth in the bladder and right renal hematuria were found. The vesical tumor was cauterized with "acid" without benefit. Cystoscopy had been done many times in the past four months by various physicians. The tumor was again cauterized and silver nitrate injected into the right renal pelvis without benefit. When nephrectomy was advised the patient came to the Clinic.

Physical examination revealed marked pallor of the skin and nails. On rectal examination, slight enlargement of the prostate was noted with a questionable induration of the posterior wall of the bladder above the gland. The systolic blood pressure was 145, and the diastolic 80. Temperature and pulse were normal. The urine contained gross blood. The combined functional test of the kidneys was 60 per cent return in 2 hours and 15 minutes; the blood urea was 34 mg. for each 100 c.c. of blood. The hemoglobin was 50 per cent, the erythrocytes numbered 3,750,000 and leucocytes 71,000. The Wassermann reaction on the blood was negative. Roentgenograms of the kidney,

ureter and bladder revealed a few small phleboliths on the left. The teeth were infected, and the tonsils enlarged and probably infected. Cystoscopic examination revealed a single papilloma 2 cm. in diameter in the wall of the bladder 3 cm. from the left ureteral orifice and 5 cm. from the internal urethral sphincter. Urine did not spurt from the right ureteral orifice during five minutes of observation; it came normally from the left. A pyelogram of the right kidney and ureter did not show evidence of bromid in the renal pelvis; the ureteric outline was normal.

A diagnosis was made of papillary epithelioma of the right renal pelvis with temporary occlusion, and secondary papillomatous metastasis in the bladder. Nephrectomy and ureterectomy were recommended with fulguration of the vesical tumor.

At operation the kidney was found to be about four times normal size, and contained a malignant papillomatous

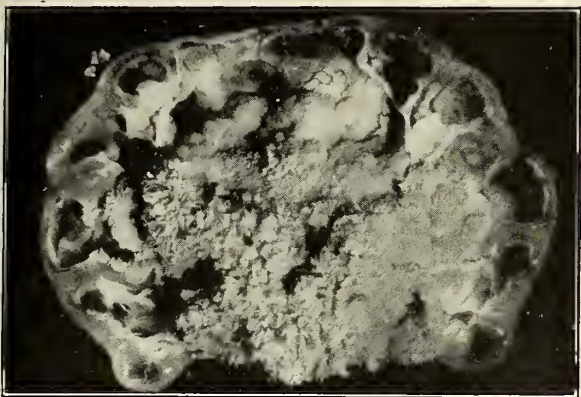


Fig. 4. A383327. Papillomatous tumor almost filling the dilated renal pelvis.

mass. The posterior half of the ureter was removed by cautery. The remainder of the ureter, which was ligated and dropped back, will be removed at a secondary operation through an anterior incision.

The pathologic report was papillary epithelioma of the renal pelvis. The specimen was quite typical. (Fig. 4.) The large papillary mass covering a comparatively small pedicle almost filled the dilated pelvis.

Papillary epitheliomas of the renal pelvis are found much more often in recent years because they are recognized clinically as well as at the operating table. The diagnosis is apparent, providing there is either hematuria or diminution in function from one kidney in the presence of a papillomatous tumor in the bladder. Occasionally, there is also a tumor protruding from the orifice of the affected ureter. Evidence of hydronephrosis as the result of tumor obstruction is often found. In every case of hematuria the possibility of papillary epithelioma must be considered. Complete ureterectomy is necessary in all these cases, since metastasis usually occurs in various portions of the ureter as well as in the bladder. Metastatic growths in the bladder are usually multiple, and have a particular tendency to recur repeatedly following removal.

Discussion by DR. A. SCHWYZER: I remember one case where I had removed what I thought a very harmless papilloma of the bladder. I was away for a while and Dr. MacLaren afterward saw the same case. The bladder was

studded with these papillomas. After a while we had to remove the bladder together with the prostate in order to get rid of what was evidently then a carcinoma.

One case I saw that was papilloma of the pelvis of the kidney. It was about the size of a walnut and that patient later on had a recurrence lower down and died. It is very important that the whole ureter as well as the kidney be removed.

DR. W. H. CONDIT: This subject is very interesting to me as I have a patient now under observation who has bilateral cystic kidneys. It seems that the incident of this anomaly is increasing—perhaps it is only the discovery of the true incident by our improved methods of diagnosis.

My patient is twenty-eight years of age. She had a pregnancy nine years ago—the baby was born well, but died very young of pneumonia. Eight years ago she consulted a physician for nervousness and albumin was discovered in the urine in large quantities. This she has cared for and watched ever since. She became pregnant again and was delivered of a nine-pound baby nineteen months ago. During the whole ante-partum period she lived practically upon buttermilk. There were twenty-four urinalyses made, with albumin ranging from plus one to plus three. Her blood pressure never rose above 150. Since the delivery of this baby, she has been very careful of her diet and has been in good health.

Two months ago the patient consulted me complaining of extreme pain in the left side with amenorrhea. I found that she was three months pregnant. Cystoscopic examination revealed a double ureter on the left side, each with its individual pelvis. The right kidney and ureter were greatly dilated, the ureter being six or seven times the lumen capacity of the two on the left side. She had plus four albumin, with a history of three repeated attacks of pyelitis in the last five months—one of them, with a temperature as high as 104, being confined to bed with this attack two weeks.

The marvelous thing about these cases is the way in which nature in some way compensates for the absence of the normal kidney tissues and permits fairly good health in spite of adverse circumstances, such as intervening pregnancies.

The question at issue was whether the extreme dilatation of the right ureter was the result of the pressure of the two pregnancies, or whether it is part of the congenital deformity. We are debating now whether or not to empty the uterus and relieve her of the gravity attending another pregnancy.

DR. A. R. COLVIN showed a specimen, in case of prostatic hypertrophy.

This patient had urinary retention. I catheterized him for a few days and his retention ceased. That was thirteen months ago and during that thirteen months he has had absolutely no symptoms. Did not have to get up once in the night. Thirteen months later, however, he gets another attack of retention and after catheterizing him again for three or four days he was able to void again. This is the size of the prostate on removal.

DR. R. E. FARR gave a lantern slide and motion picture demonstration of Practical Local Anesthesia Technic.

DR. J. G. CROSS gave the following case report at the May meeting.

This patient was a girl 14 years of age, weighed 89 pounds, former weight 97 pounds. Was first seen March 18th. She was taken sick in April, 1921, with what seemed to be an acute enteritis. The stools soon changed to those characteristic of colitis within the first three weeks. Since that time she has passed mucous stools tinged with blood nearly all the time. She had not been under treatment by a local physician until just before I saw her. There was an afternoon temperature of septic type. Physical examination showed simply an emaciated frame with no signs of tuberculosis in the lungs, glands or abdomen. She would not admit tenderness nor pain, her only complaint being of weakness and tenesmus.

Proctoscopic and digital examination of the bowels showed a thickened condition of the rectum, the walls of which were grayish and soft. There was no mass recognized. Examination of smears from these walls, as well as specimens of stool, were done repeatedly, both warm stage and cultural methods. No amebæ nor pubogenic bacteria were ever found. Examinations were repeatedly negative for tubercle bacilli. No barium examination was made.

Two weeks after admission to the hospital the recto-vaginal fistula developed. Three weeks ago, under local anesthesia, the loop ileum was brought out through the abdominal wall and cut across, both ends being left outside, the lower one for irrigation, the other draining the digestive tube. Temperature dropped after this and appetite improved. No other improvement was noted and she steadily lost in strength and died May 10th. The autopsy reveals carcinoma of the rectum. The polypus begins about 18 inches above the tumor, as you will see from the specimen, and besides numerous discrete polypi there was one collection as large as a dime hanging by a pedicle about the size of a lead pencil. Sections of the growth in the rectum shows it to be a carcinoma.

PROGRESS

Abstracts to be submitted to Section Supervisors.

MEDICINE

SUPERVISORS:

F. J. HIRSCHBOECK,
FIDELITY BLDG., DULUTH
THOMAS A. PEPPARD,
LA SALLE BLDG., MINNEAPOLIS

OBJECTS AND METHOD OF DIET ADJUSTMENT
IN DIABETES—Woodyatt (Arch. Int. Med., Aug., 1921):
A. Nature of the diabetic anomaly and principles of treatment.

1. Specific defect characterizing diabetes is the inability of the body to utilize as much glucose as may be utilized by the normal body when the supply exceeds certain limits. Diabetic is capable of utilizing a limited quantity of glucose.

2. Work of pancreas as an endocrine organ, as far as we know, is solely with the disposition of glucose. Except

for the occurrence of diabetes, the pancreas would not be thought of as an endocrine.

Glucose may act as a stimulant to pancreatic function and a weakened pancreas thus be stimulated to fatigue and decreased function. Lessened glucose allows functional rest and limited recuperation.

3. Occurrence of abnormal quantities of acid bodies appears to be the immediate result of oxidation of certain fatty acid in the absence of a sufficient proportion of "oxidizing" glucose. There is a definite ratio between the quantity of glucose oxidizing in the body and the maximum quantity of ketogenic fatty acid that can be oxidized in the same time without the acetone bodies.

From the molecular weights of glucose and oleic and palmitic acid Shaffer expressed in grams a ratio which would be about 1.5 grams fatty acid to 1 gram glucose. If, in clinical work, this ratio is exceeded, acidosis will develop.

The rationale of treatment, then, is to bring the quantity of glucose entering the metabolism from all sources below the quantity that can be utilized and to adjust in proper relationship the glucose and fatty acid supply so that there will be freedom from ketonuria.

B. Endogenous factors of food supply.

It must be remembered that during starvation heat continues to be produced, and the magnitude of food supply from the body tissues must be appreciated. Amount of fat in the fasting organism materially affects amount of protein burned. Ingestion of fat may spare tissue fat and prevent too great protein loss.

It is possible to maintain the body with a diet containing only 10 per cent more calories than are produced in fasting.

C. Dealing with food supply in terms of carbohydrate protein and fat.

Numerable food combinations may affect the same patient in innumerable ways. In reality protein, carbohydrates and fat as such are not the substances that are finally oxidized to yield energy. Starch and glycose are resolved into glucose. Protein becomes a mixture of amino acids. Fat must be saponified into glycerol and higher fatty acid. In food analyses all listed as carbohydrate is not necessarily utilizable carbohydrate. Fats completely saponified yield approximately 10 parts glycerol and 90 parts higher fatty acids. One hundred (100) grams mixed food protein is capable of introducing into the metabolism approximately 58 grams of glucose.

All foods of the body except a small protein fraction resolve themselves into glucose or higher fatty acids.

100 grams carbohydrate yields 100 grams G + 0 gm. F. A.; 100 grams protein yields 58 grams G + 46 gm. (?) F. A.; 100 grams fat yields 10 grams G + 90 gm. F. A.

(Approximately) where G = Glucose and F. A. = fatty acid. Relationship may then be expressed as food which is introduced by a given combination as follows:

$$I \quad G = C + 0.58 P + 0.1F$$

$$II \quad F. A. = 0.46 P + 0.9F$$

where

C = Carbohydrate

P = Protein

F = Fat

If the ratio is taken F.A. : G = 1.5 : 1, then when

FA

$$\frac{\text{FA}}{\text{G}} = 1.5$$

G

$$.46P + 0.9F$$

$$\frac{\text{C} + .58P + 0.1F}{F = 2C + .54P, \text{ or for clinical purposes}}$$

$$F = 2C + \frac{P}{2}$$

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D. Estimation of Optimal Diets.
Use then formula No. 1, i. e. $G = C + .58P + 0.1F$ and
No. 2 $F = 2C + \frac{P}{2}$

Find the tolerance and assign value to G in equation No. 1, i. e., suppose 100 grams then
100 grams = $C + .58P + 0.1F$
1 gram protein per kilo as a conservative minimum.

For 50 kilo patient then $P = 50$, $F = 2C + \frac{P}{2}$ or
 $2C + 25$

Glucose yielded by 50 gms. Protein = 29 (i. e., .58 + 50) hence 100, or assigned value for G, minus 29 = 71 gm. to be distributed between fat and CHO.

$$\begin{aligned} C + 0.1F &= 71 \\ 10C + F &= 710 \\ F &= 2C + 25 \\ 2C + 25 &= 710 - 10C \\ C &= 57 \text{ gms.} \\ F &= 2C + 25 \\ F &= 114 + 25 = 139 \text{ gms.} \end{aligned}$$

Diet would then be as follows:

P 50 gms.
F 139 gms.
C 57 gms.
Calories 1680.

T. A. PEPPARD.

ABSTRACTS FROM RECENT MEDICAL AND PUBLIC HEALTH PAPERS

DIV. V. D.—U. S. P. H. SERVICE

Unreliability of Serologic Diagnosis of Syphilis During Pregnancy.—Stühmer and Dreyer applied parallel Wassermann and other serologic tests twice a week in their maternity cases, and they thus have a series of 1,000 tests of parturients' serum, with 2,500 control tests of known syphilitic or nonsyphilitic serum. These experiences show that the serum of healthy women may respond positively to the Wassermann test during pregnancy and childbirth. Unreliable findings were obtained in fully 10 per cent. The retroplacental blood is especially liable to respond misleadingly, and also the blood in the umbilical vein. The fewest erroneous responses were obtained with the Sachs-Georgi flocculation test. (A. Stühmer and K. Dreyer, *Zeitschrift für Geburtshilfe und Gynäk.*, Berlin, November 12, 1921; *Journal A. M. A.*, February 25, 1922.)

Enlargement of the Lower Lip from Syphilis.—Montgom-

ery and Culver note that besides the typical leucic papule or small, or large gumma, there occasionally arises, in certain regions, a diffuse syphilitic infiltration. The lower lip is especially subject to this and the deformity produced is so striking as to constitute a valuable diagnostic feature. (Douglass W. Montgomery and George D. Culver, *American Journal of Syphilis*, January, 1922.)

Roentgenology of Syphilis in Bone.—Skinner compares the bone lesions of syphilis with the bone lesions of tuberculosis and classifies the shadow values of bone lesions: 1. Bone lesions cast shadows which are *constructive* in osteomyelitis and syphilis. 2. Bone lesions cast shadows which are destructive in tuberculosis and malignancy. 3. Bone tumors which are constructive are usually benign: bone tumors in which destructive changes predominate are malignant.

The keynote of leucic bone is osteoplasia. Contrasting conditions, such as tuberculosis and malignancy, produce lost of bone salts or haliteresis. Syphilitic lesions produce sharp and dense shadows while tuberculosis gives poor photographic results on account of the hypomacra. Author discusses syphilis of the long bones, syphilis of the skull, and syphilis of the joints. The joint lesions of hereditary syphilis do not cast diagnostic shadows. The reaction of bone syphilis to proper therapy is usually rapid. (E. H. Skinner, *American Journal of Syphilis*, January, 1922.)

Sigma Reaction for Syphilis.—Author summarizes as follows:

1. The sigma reaction for syphilis described by Dyer and Ward (*Lancet*, 1921, 1,956) is much simpler in technique than is the Wassermann reaction.

2. The results of the series here reported would seem to show that the results as regards blood serum tests in untreated cases are as good or even slightly better than the results obtained by the Wassermann reaction, when judged from a clinical standpoint.

3. The results obtained in the cerebro-spinal fluid have not been so good as have results of the Wassermann reaction. These cases are however, so few that it is impossible to draw any inference from them.

4. The test is easily standardizable both as regards technique and the reporting of results.

5. Being a quantitative reaction it is possible that important information as to prognosis or the effect of treatment may result in the light of further knowledge. (A. F. Rook, *Lancet*, London, January 21, 1922.)

Syphilography and Dermatology in 1921.—Gougerot comments on the lively discussion still going on as to the comparative merits of large intravenous or small intramuscular or subcutaneous doses of the arsphenamins. All agree on the danger of inadequate treatment. Almost all agree also on the necessity for mercury to consolidate the results obtained with the arsphenamins. The artobismuthate of potassium and sodium has been extolled in treatment of syphilis by Levaditi and Sazerac, but no conclusive evidence has been offered as yet, and there is some risk that this drug may induce fever and albuminuria and a stomatitis like that of mercury. Several have reported good results by associating protein therapy with arsphenamin. Some state that the phenomena of the secondary stage disappeared as promptly under parenteral injections of peptone as under arsphenamin treatment.

Schreiner advises an intravenous injection of peptone four hours after the injection of arsphenamin. "Is a rebellious Wassermann reaction due to the habit of secreting antibodies or is it a sign of still persisting infection?" He inclines to the latter view, himself. To ward off toxic action from the arsenicals, sodium hyposulphite is advocated by some; alkalines, etc., by others. (H. Gougerot, *Médecine*, Paris, November, 1921; *Journal A. M. A.* February 4, 1922.)

Abortive Treatment of Syphilis.—This communication states that fifteen patients were given treatment at once or within two weeks after intercourse with a person known to have syphilis. Four injections of neo-arsphenamin were given, increasing from 0.15 to 0.6, with intervals of three, four and five days. Not one has developed any symptoms during the year since, re-examined every three months. (A. Tzank and H. Cambessédés, *Médecine*, Paris, December, 1921; *Journal A. M. A.*, February 11, 1922.)

International Congress on Venereal Diseases (in Prague).—Organized by the League of Red Cross Societies held in Prague, December 5-10. Besides Czechoslovakia, Poland, Jugoslavia, Bulgaria and Greece were represented. Dr. Janovsky, professor, University of Prague, was chairman. The consensus of the members was that sex education should be started very early in the school, and that it can best be given by the teachers, who must, of course, be well posted on the subject. Instruction on venereal disease must be given by physicians and has to come later, before the child leaves school. Self-disinfection was discussed. Notification was realized as a valuable measure, but was not recommended under the present circumstances. (Prague Correspondent, *Journal A. M. A.*, February 4, 1922.)

Prevention of Venereal Diseases.—The Medical Officer of Health for Liverpool reports on the work done during 1920 at the five city clinics during this time. The number of patients on the books was 9,327, the number of these discontinuing treatment before cure was completed was 4,105. This in spite of efforts to get patients back, sending of letters and in the case of women, special visits made by a member of the staff—a woman.

In July, 1916, a beginning was made in the examination of cases of still birth in relation to syphilis. Since then over 1,300 cases have been investigated. During 1920, 411 still-born infants were examined, and of these 43 gave positive evidence of syphilis (i. e., over 10 per cent). (E. W. Hope, *Journal of State Medicine*, November, 1921.)

Survey of the Effect of Venereal Disease Legislation in Western Australia for a Period of Five Years.—"The total number of cases reported during the five years (June 30, 1916 to July 1, 1921) was 5,713 and of these 4,887 occurred amongst males and 826 amongst females, a proportion of approximately six to one. There were 4,355 cases of gonorrhea and 1,055 cases of syphilis, the proportion being approximately four of the former to one of the latter. We find, however that whilst there were five cases of gonorrhea to one of syphilis amongst the males, the ratio was only two to one amongst the females."

"Disregarding congenital syphilis, of the total cases of

this disease recorded 42 per cent are notified as primary, 33 per cent as secondary and 26 per cent as tertiary. The notifications of congenital syphilis are so few in number as to suggest either failure to recognize or failure to notify them."

There has been a steady increase in clinic attendance during the five years: In 1916-17, 361 patients were treated; in 1920-21, 919 patients were treated.

During the five year period only about 500 patients have discontinued treatment and have been lost sight of. (R. C. Everitt Atkinson, *Medical Journal of Australia*, January 21, 1922.)

QUINIDIN THERAPY IN HEART DISEASE. D. C. Wolferth (*The Med. Clin. of No. Amer.*, Nov., 1921) presents the record of a patient with auricular fibrillation, who was treated with quinidin sulphate and discussed the action, therapeutic possibilities, and limitations of the drug.

The record presented was that of a typical case of auricular fibrillation, diagnosis being confirmed by an electrocardiogram. Treatment at first consisted of rest in bed, limited fluid intake and digitalis. The general condition improved, but the fibrillation persisted. The digitalis was then discontinued and quinidin sulphate in increasing doses given, until he received 0.6 gm. t. i. d. Fibrillation ceased and the quinidin was reduced to 0.3 gm. t. i. d. with digitan 0.032 gm. t. i. d. In five days the fibrillation returned. This time three doses of 0.6 gm. quinidin sulphate restored the normal rhythm. He then steadily improved, taking 0.2 gm. quinidin t. i. d. and small doses of digitalis. After 2 months he felt well and was gradually increasing his activities.

He then discusses the discovery of the peculiar effect of quinidin in auricular flutter and fibrillation, referring to the work of Frey, Santesson and Wenckebach. Experimental studies of the effect of quinidin seem to indicate that the action is depressant and exerted on the heart muscle, rather than through the cardiac nerves. There seems to be only slight depression on conduction.

Published reports show that in about half of the cases of auricular flutter and fibrillation a normal rhythm was restored. It seems that quinidin tends in fibrillation to develop auricular flutter and then development of normal rhythm; apparently a reversal of the sequence of events taking place in the development of fibrillation. These effects are then contrasted with those of digitalis.

After discussing the effect of quinidin on conduction (observed clinically), the effect on symptoms, duration of restored normal rhythm, selection of patients for treatment and details of treatment, the writer estimates the value of quinidin in the therapy of heart disease as follows: "At present the proportion of cases in which it can be used with real advantage to the patient, either with or in place of digitalis, is comparatively small, in our experience not over 25 per cent. Digitalis retains its place as the most important drug in the treatment of auricular fibrillation. It has not yet been demonstrated that those cases most successfully treated with quinidin will not eventually have to rely on digitalis."

P. G. BOMAN.

SURGERY

SUPERVISORS:

E. MENDELSSOHN JONES,

LOWRY BLDG., ST. PAUL

VERNE C. HUNT,

MAYO CLINIC, ROCHESTER

TREATMENT OF MULTIPLE PAPILLOMAS OF THE LARYNX—G. B. New (*Ann. of Otolaryngology, Rhinology, and Laryngology*, 1921, XXX, 631): The treatment of multiple papillomas of the larynx in children has always been difficult because of the tendency to recurrence. Many methods have been employed, such as tracheotomy, thyrotomy and cautery, endoscopic operative measures, fulguration, the application of various medicines locally, and x-ray and radium. During the past six years the author has employed radium both inside the larynx and outside the neck, with more satisfactory results than by any other method.

Mackenzie, Clark, and Smith stated that they believe tracheotomy to be the most efficient method of treating papillomas of the larynx. While the value of tracheotomy is well known, cases are reported in which the patients have worn tubes for years without improvement. Polyak advocates the use of radium as a substitute for operative measures. Abbe, in 1898, was the first in this country to treat multiple papillomas of the larynx with radium. Several observers have reported poor results with radium, but on the whole the method seems quite satisfactory. Lynch's suspension apparatus has added a great deal to the efficient care of these patients. His results in removing multiple papillomas by operative measures have been superior to any others on record in this country. He now believes, however, that the best method of treatment is by fulguration or with acid nitrate of mercury.

From the year 1914 to 1920 the author has examined at the Mayo Clinic twenty-six children, between the ages of ten and twelve, who had multiple papillomas of the larynx. Such patients were usually brought to the Clinic because of hoarseness or shortness of breath which began at the age of two or three months as a slight wheezing or crowing cough. Sometimes symptoms do not appear until the child is three or four years old.

Multiple papillomas of the larynx are often diagnosed as laryngismus stridulus, asthma, and enlarged thymus, but these conditions can be ruled out by a careful history. The diagnosis can be made only by laryngoscopic examination.

Many of the patients in this series had been operated on by endoscopic methods. One patient had had six thyrotomies and cauteries, which resulted in a marked scarring of the glottis and the necessity of wearing a tracheotomy tube. One patient had had six suspensions and removal of papillomas, but on examination at the Clinic the larynx was filled with a papillomatous growth. Nineteen of the patients had tracheotomies previously or shortly after their arrival at the Clinic. Tracheotomy was not performed unless obstruction made it necessary.

The treatment in this series of cases was given under ether by means of the Lynch suspension apparatus. Except in a few of the early cases no attempt was made to

remove the papillomas. A small tube containing radium salt or emanation was inserted into the glottis and kept moving under direct observation. From 75 mg. to 150 mg. or milliouries of radium were used for from twenty to thirty-five minutes. No screening was used except the silver tube of the container, which was 1 mm. thick. Treatments were given once in six weeks or two months. Patients must be seen at definite intervals. The most suspensions given in one case were six, and the least, one. In addition to this radium was applied outside the larynx; about 3,000 mg. hours were given, using one inch of wood and 2 mm. of lead screening.

Nine of the twenty-six cases can not be considered in the results, as some patients were not treated at all and others received only one treatment because they could not return at definite intervals.

Of the seventeen patients concerning whom definite information was obtained, eleven are entirely free from papillomas; nine of these had had tracheotomies and the tube had been removed. The tube is always left in place at least six months after the larynx is free from papillomas. One patient suffered a collapse of the trachea above the opening but a two-way tube was inserted for a while and later removed. Two of the eleven patients did not have tracheotomies or treatment by suspension, because of frequent colds, but received external applications of radium. Six of the seventeen patients are still under treatment, five of these during the last year only. Four of the six patients are almost entirely free of papillomas, and the voice is fairly good. Three of these four can cork their tracheotomy tubes. In the entire group the author has not seen any bad results following the use of radium, and he believes this is undoubtedly due to the fact that the radium was under direct observation and was kept moving while in the glottis.

FRENCH K. HANSEL.

CANCER OF THE BREAST—Byron B. Davis (*Arch. of Surg.*, Sept., 1921, pages 348-356): The author reports 190 cases of cancer of the breast, of which he has been able to trace 122. Of this number, seventy-five were free from recurrence for from three to twenty-one years and forty-seven were reported as having died or as suffering from a hopeless recurrence.

No one any longer reports his cancer patients as cured—a three or five year limit is purely arbitrary. The author has had patients remain apparently well for five, eight, and ten years, and then report a recurrence from which they soon died.

The length of time the existence of the lump in the breast has been known and the apparent extent of the disease at the time of operation are not nearly such good indexes of the prognosis as one would theoretically suppose. The discovery of the lump is usually accidental, bearing no definite relationship to the date of the beginning of the disease, or to the extent of its dissemination. Some of the patients with apparently mammary and axillary involvement have been free from recurrence for many years and per contra several patients with only a small lump in the breast, recently discovered, with no apparent extension to the axillary or other glands, have died of early and rapid carcinoma. The author reports two illustrative cases and

states that there are degrees of malignancy of carcinoma of the breast.

Local recurrence should not be considered the sounding of the death knell. Several of the author's patients have been operated upon for a first, second and even third recurrence and are still alive and apparently free from disease up to ten years after the last recurrence.

When one can make a positive pre-operative diagnosis of cancer, it is too late for the best average results. The ideal operation for mammary carcinoma is the one that starts in as an exploratory incision.

The author believes that the most usual pre-cancerous lesions recognizable in the breast are benign tumors and chronic mastitis and urges the removal of all benign breast tumors and the amputation of breasts that are the seat of chronic mastitis.

The most important lymphatic highway leads from the breast to the axillary glands. Invasion of the axillary glands is usually the first point of attack outside the breast and the pectoral fascia. Occasionally the lungs, the liver and other organs are invaded first and, in rare instances, the patient may die without the axillary glands having been involved.

Cancer cells may reach the mediastinum, the lungs or the pleura by growing along the lymphatics that accompany the perforating branches of the internal mammary artery. About 50 per cent of late cancer cases show invasion of the thoracic cavity.

The author had eight cases which later developed cancer in the opposite breast. Invasion of the peritoneal cavity and liver occurs in the course of this disease. Invasion of the liver has been found in 36.6 per cent of the cases.

The author believes that intensive post-operative x-ray therapy increases the prospects of permanent relief.

Occasional cases are encountered in which it is better not to operate. Those mentioned are: (1) Deep involvement of the chest wall; (2) firm fixation of the tissues to the chest wall; (3) fixation of the axillary mass; (4) very extensive skin involvement; (5) enlarged and fixed supraclavicular glands; (6) secondary growths on the lungs, liver or other viscera; (7) bone metastasis.

The author believes the time is coming when 70 or 80 per cent of patients with carcinoma of the breast may be permanently relieved.

FRED R. SANDERSON.

THE USE OF POTASSIUM NITRATE IN OSTEO-MYELITIS AND OTHER CHRONIC INFECTIONS: J. R. Pennington (*Jour. Med. Rec.*, 1921, Vol. 2023 C., pp. 975-977). The author makes startling remarks about the benefits of this chemical. He briefly refers to the previous use of a double salt of aluminum and potassium nitrate by an engraver in Baltimore, who had osteomyelitis of the scapula. This chemical consists of 97 per cent potassium and 2½ per cent aluminum. The author's chemical contains only potassium nitrate.

It is used in the form of a poultice. From 10 to 60 grains of potassium nitrate is put with one ounce of rolled oats and enough hot water is added to make a poultice-like mass. The mixture is placed $\frac{1}{8}$ inch thick between a double layer of gauze of the desired size, and this is

applied to the affected part and then is covered with some impermeable dressing to preserve the heat.

This kind of dressing sets up an immediate inflammatory reaction of the tissues from the skin down to and including the bone, as manifested by hyperemia of the skin, gradually forming pustules, by the marked increase of the discharge and by the gradual changes in the bone, including the absorption of sequestra or extrusion of the same. In the course of a few days the initial inflammatory reaction subsides until healing takes place. This form of dressing has no effect on the normal tissues. The dressing is changed as often as it is necessary.

He has observed that this mixture is not antiseptic, but, on the contrary, it is a culture medium. In discussing its beneficial effects he concludes that it acts by a process of osmosis, the skin acting as a dialyzer. The reaction of the already diseased tissues sets up a large flow of lymph, carrying with it organisms.

He reports only one case, age 49, with osteomyelitis of the tibia, discharging sinus and foul odor.

This was cured completely in eight months. He thinks that this method would be preferable to surgical treatment.

P. BLANCO.

SOME PROBLEMS IN CONNECTION WITH THE SURGERY OF THE BILIARY TRACT—A. Murat Willis (*Ann. of Surg.*, 1922, 75, 196): Although great advances have been made in the diagnosis and treatment of diseases of the biliary tract, Dr. Willis believes there are still many questions open to discussion and improvement. He agrees with C. H. Mayo in the desirability of early diagnosis of cholecystitis in order to save the patient the danger of serious complicating disease. He suggests, however, the possibility of the rank and file of surgeons following the leaders in the profession without full consideration of all the problems involved.

The author notes the danger of frequent gall-bladder operations for indefinite upper abdominal discomfort, while attempting to make too early diagnoses. He feels there are many pathologic conditions which unquestionably indicate cholecystectomy; that is, malignancy, hydrops of the gall-bladder, cicatricial closure of cystic duct, strawberry gall-bladder, and so forth. However, in many cases he advises cholecystostomy; that is, in those due to poor general condition with myocardial or renal involvement, in those in which the local condition shows many dense adhesions distorting and preventing satisfactory palpation of the ducts, or in those with pus or thickened contracted walls.

Patients with a low grade cholecystitis, perhaps with sterile calculi and very few demonstrable bacteria in the bile, have only mild discomfort and most surgeons would advise cholecystostomy. In this type of case, however, the poorest results follow drainage. The gall-bladder should be removed without drainage. Experiments on animals have shown that sterile bile in the peritoneal cavity formed very few adhesions, while the addition of either a foreign body, infection, or both, always caused profuse, dense adhesions. Therefore, as the rubber drain is a foreign body and lends a passage for infection from the outside,

cholecystectomy without drainage is preferred in mild, comparatively sterile cases.

Willis suggests the possibility of the old condemned procedure of cholecystotomy as an operation of choice in certain selected cases; that is, in cases of low grade infection or none at all, where the gall-bladder does not show demonstrable pathologic changes and presumably has suffered no alteration in functional ability. Cholecystotomy has a distinct field of usefulness in such cases.

L. H. FOWLER.

RECOGNITION OF THE NASAL GANGLION SYNDROME

R. A. BARLOW

(Southern Minnesota Medical Association, December 5)

The author discusses the clinical manifestations and treatment of sphenopalatine disturbances. Irritation of the sphenopalatine ganglion so closely simulates the repeated paroxysms of sneezing seen in hay-fever that some patients with this condition have been incorrectly diagnosed.

Sphenopalatine disturbances are classified as two types: the neuralgic and the sympathetic. Patients with neuralgic disturbances complain of severe lower half headaches. Patients with sympathetic disturbances have persistent sneezing, lacrimation, and hay-fever-like attacks, which are not dependent on season or climate.

The technic for the treatment of the condition is very simple. The nasal ganglion is first cocaineized by passing an applicator with cotton dipped in 10 per cent cocaine into the nose to the posterior end of the middle turbinate. This is withdrawn and a second applicator, dipped in sterile water, is inserted to the same spot and allowed to remain about one minute. This procedure rules out functional disturbances. If the patient has not had any effect by the second day he is again cocaineized. The second applicator is this time dipped in 50 per cent silver nitrate solution instead of sterile water. This is allowed to remain in position about thirty seconds. This treatment is applied to both sides and is usually followed by severe attacks of sneezing. About the third day the treatment is repeated. As a general rule two treatments are sufficient.

DISCUSSION ON THE PAPER OF R. A. BARLOW

C. L. LARSEN: I wish to congratulate Dr. Barlow on his splendid exposition of a subject that has been very much neglected. I believe this is only the second time that this subject has been presented before any of our local medical societies, and he has had probably more experience with it than anyone else in the Northwest. The subject has been so thoroughly covered that all I can do is to elaborate on some important points.

He has differentiated between the painful syndrome and the sympathetic syndrome. The neuralgic or painful syndrome is the more frequent of the two, but a sharp division between the neuralgic and sympathetic syndrome is almost impossible, because the sympathetic syndrome plays an important part in the pain complexes as manifested either by vasomotor or secretory phenomena. It is also impossible to state why one patient suffers from the painful syndrome, such as he has described, eye ache, ear ache, neck ache or tooth ache, and why another patient has symptoms of the sympathetic variety, such as sneezing, rhinorrhea or

hydrorrhea. These sympathetic cases are more amenable to treatment than the neuralgic type, and applications of cocaine followed by applications of silver nitrate or phenol solution frequently help these cases. In the painful cases you will get a cure by the injections.

In order to make a diagnosis of nasal hydrorrhea we must of necessity exclude all pathologic conditions in the nose. All these symptoms have been called lower half headaches, and Cushing has aptly alluded to them as Sluder's neuralgia. It seems to be an appropriate term. These lower half headaches are caused by two conditions, a lesion of the nasal ganglion itself, and a lesion of the sphenoidal sinus. We have but to remember that cocaine applications to the sphenopalatine foramen will relieve the symptoms caused by a lesion of the ganglion itself, but will not affect a lesion of the sphenoidal sinus unless it acts as a fore-runner.

It would be interesting, indeed, to know the relationship, and I believe one exists, between these conditions and asthma. It would also be interesting to know if there is a relationship between nasal hydrorrhea and the endocrine glands. This is a symptom-complex which will be developed in the next few years, and it is to be hoped a great deal of light will be thrown on this very important subject. I feel this condition has been more neglected than abused. Neurologists very frequently overlook the symptoms and the rhinologist is apt to overlook the condition unless he finds actual pathology or pus in the nose.

I wish to thank Dr. Barlow for his thoughtful and helpful suggestions.

DR. A. W. ADSON, Rochester: The subject of sphenopalatine neuralgia, particularly the pain type of syndrome, is of especial interest to me, since there has been a great deal of discussion recently as to whether or not the condition of a true sphenopalatine neuralgia really exists. Dr. Barlow of the Mayo Clinic has been working on the subject for some time. In the literature being published by Sluder and Cushing, you will note that one takes the affirmative stand while the other doubts the existence of a true sphenopalatine neuralgia, believing that it may be a part of trifacial neuralgia. The subject has been discussed rather extensively, and practically all of the brain surgeons feel convinced that there is a definite syndrome of sphenopalatine neuralgia independent of trifacial neuralgia, which is not relieved by division of the posterior root.

Dr. Barlow has taken a conservative attitude and has done so wisely, because if an attempt is made to explain every pain due to a certain ganglion, we will be mistaken in a large number of cases. There is, however, a definite sphenopalatine neuralgia that is not relieved by operation on the gasserian ganglion, and the stand is well taken by Doctors Barlow and Sluder that some method of treatment should be instituted to relieve these patients.

Three points should be emphasized with regard to the diagnosis, e. g., pain underneath the malar bone, pain in the maxilla or root of the nose, and pain above the eye, with a possible radiation of pain in all. I recall one case in particular in which the cocaine was placed over the sphenopalatine area, after an operation on the posterior root had been performed, and instant relief was experienced. I am convinced that there is a syndrome charac-

teristic of true sphenopalatine neuralgia, and the assistance of men specializing in nose and throat work will be necessary to relieve patients whom we are unable to relieve by radical procedure.

DR. R. A. BARLOW, Rochester (closing): Dr. Larsen spoke of the difficulty of differentiating the sympathetic syndrome and the painful syndrome. I might add that occasionally these patients start in with the sympathetic type, which eventually merges into the neuralgic, or the two may be combined.

My interest has been stimulated largely by seeing patients who had been operated on for mastoid disease and various other conditions, and yet not relieved of the pain. They had what appeared to be the sphenopalatine syndrome, which was relieved by attacking the ganglion itself. The sphenoid sinus may or may not be involved with it. We occasionally see a hyperplastic sphenoiditis associated with this pain, and whether or not the etiology is coincident is difficult to determine.

As Dr. Adson has remarked, we have assumed a conservative attitude purposely because any one working in this field is apt to become enthusiastic and attribute every headache to the sphenopalatine ganglion and to misconstrue some of the results. This syndrome does exist. We should be on the lookout for it; at the same time it occurs in a realm of pain which may be due to a number of other conditions, and an accurate differential diagnosis must be made before good results can be obtained.

A MEMBER: How many cases have you seen?

DR. BARLOW: In the routine examination of patients at the clinic sixteen such cases were observed in one year, which leads me to believe that it is not a common condition.

SPECIAL POINTS IN THE TECHNIC OF OPERATIONS ON THE THYROID GLAND

Crile and Lower (Ann. of Surg., Vol. 75, No. 1) bring out many instructive points concerning surgery of the thyroid gland.

(1) The amount of gland to be left should in general be the functional equivalent of a normal gland. This would mean only a small portion of an exophthalmic goitre; but in the case of a large colloid goitre, a bulk larger than that of a normal thyroid is required because the colloid goitre is not as active as the normal gland.

(2) Unless the median lobe was enlarged it was not removed. Occasionally after operation this quiescent lobe increased markedly in size. As a matter of precaution this lobe is now routinely removed.

(3) When more than a vertical incision of the pre-glandular muscles is required a transverse division is done.

(4) Tying the four arteries outside the capsule occasionally results in parathyroid deficiency because of the limitation of their blood supply.

(5) Catching of masses of thyroid tissue by large forceps and then ligating them by needle and catgut "en masse" minimized the number of ligatures and shortened the time of operation, but the pulling together of such a mass of tissue occasionally interfered with the voice.

(6) Turning out the gland with the finger after the gland has been freely exposed necessitates traction, pressure and stretching and mechanical abuse of the recurrent

nerves frequently results. This applies especially in the case of a bilateral deeply burrowing goitre that is wedged tightly in behind the larynx. When the lower pole of a large thyroid extends into the chest and an attempt is made to turn it out with the finger large veins are frequently torn and troublesome bleeding occurs.

(7) Catching and tying bleeding vessels on the surface of the trachea causes irritation, coughing and increased mucus due to interference with the sensory nerves which enter the wall of the trachea. This can be avoided by a sharp, bloodless dissection above the line of cleavage.

(8) With nitrous oxid oxygen apparatus, oxygen under pressure may be at once given in case of tracheal obstruction. The authors have seen a collapsed trachea dilated at will with a change in pressure by means of the gas oxygen apparatus. If tracheotomy is needed a transverse, small opening between the rings with a knife should be made early rather than too late. As soon as the obstruction is removed, the trachea may be closed.

(9) The operative field should be kept clear at all times.

(10) If the trachea be opened the inhalation of blood must be avoided. This is prevented by the control of the local field by hemostats and by skilled assistants.

(11) In serious cases delayed closure of the wound shortens the time of operation. There is practically no postoperative pain or discomfort; thus it lessens the postoperative drive. It also prevents the absorption of wound secretion as the wound is packed with 1-5000 flavine gauze. Aseptic wound secretion has always been known to cause some postoperative increase in temperature in normal non-sensitized individuals, but in the hypersensitized exophthalmic goitre patients, this reaction may be multiplied many times and become a raging destroying fever.

(12) The operation may be stopped at any time if there is any doubt of the outcome. Tie off the ligatures and dress the wound with flavine; the operation can usually be resumed and completed on the following day.

(13) X-ray treatment of the thyroid has the following disadvantages:

- (a) The dose required to produce a given effect is at best a guess.
- (b) Relapses are common.
- (c) The delay in unsuccessful cases leads to serious damage to certain organs,—the myocardium, liver, nervous system, etc.
- (d) In case of operation later, the scar tissue and adhesions caused by the x-ray are a handicap. The dilemma in the use of x-ray is: Myxedema or relapse.

(14) The authors employ ligation only as a preliminary to thyroidectomy. The good effect of ligation, in the authors' opinion, is due mostly to a break in the nerve supply of the thyroid since the principal sympathetic nerves run in the walls of the superior thyroid arteries.

(15) Diagnosis of hyperthyroidism is the indication for thyroidectomy. In view of the comparatively short stay in the hospital, the slight risk, the inconsequential scar, the authors are prepared to accept the dictum "operate on diagnosis."

E. MENDELSSOHN JONES.

TENDON TRANSPLANTATION FOR WRIST DROP

K. SPEED

(Surg. Clinics of Chicago, 1920, Vol. 4, No. 6, pp. 1139-49)

Describes the former operation devised by the author consisting in transplanting of one-half each of the flexor carpi radialis and ulnaris tendons into the base of the second and fifth metacarpal bones respectively. This was a temporary measure to hold the hand in hyperextension while waiting for the time of suturing the musculospiral nerve.

Murphy described in 1915 his operation of using the flexor carpi radialis alone, inserting it into all three extensors of the thumb and into the index and common extensor. But this is not practical because of the large number of tendons attached to one single tendon.

Hyperextension of the wrist is essential in the treatment of wrist drop by tendon transplant.

The operation of choice uses three tendons: The flexor carpi radialis, flexor carpi ulnaris and the supinator. The *flexor carpi ulnaris* is transplanted into the several tendons of the extensor communis digitorum, especially into the extensor indicis and the extensor longus pollicis. The *flexor carpi radialis* is transplanted into the extensor brevis pollicis and the abductor longus pollicis. These transplantations serve to extend hand and fingers and also to abduct and extend the thumb.

The supinator arises in the lateral epicondyle of the humerus and is inserted into inner surface of the radius. It is severed from the radial insertion and inserted into the belly of the common extensor while the hand is in full extension. The pronator radii teres, supplied by the median nerve, may be used when the new supply of the supinator is severed (branch of musculospiral).

He described the technique, which is self-explanatory. Uses one posterior medial incision, and two anterior later incisions to expose the flexor tendons. The belly of the extensor longus digitorum is split lengthways to expose the supinator. The hand and forearm are put on a splint with hand hyperextended and thumb abducted.

P. BLANCO.

plete destruction of the mucosa and a vascular blocking from obliterative end-arteritis. With suitable filtration the obliterative action is carried deeper. The effect on the ovary is not satisfactorily explained. There is much difference of opinion. Gauss and many German workers believe that the amenorrhea results from action on the ovary. Kelly, together with many of the French, holds that there is direct action in the uterine muscles and vessels, a vasomotor paralysis and obliterative end-arteritis. There are also effects through the blood even from short treatment, since it has been well established that repeated and prolonged exposure in radium workers causes destruction of red blood cells, leucocytes, and finally of the blood-forming organs, giving a final picture resembling pernicious anemia. Koenig leaves unexplained his idea of the action in control of uterine bleeding.

Technique: This is rather minutely reviewed from a technical standpoint. The dosage is somewhat empirical, but Koenig believes this should be expressed to show the number of milligrams, the number of hours exposure, and frequency of repetition. He uses from 50 to 100 mg. filtered with brass and rubber, or brass, aluminum, and rubber, for an exposure of 24 hours. The patient is anesthetized, subjected to careful pelvic examination, the cervix is dilated and a diagnostic curettage is done. The tube with radium is placed in the uterine canal and the vagina well protected with gauze packs. In young women the same dose is left in situ for a shorter period, and repeated if necessary.

Indications: The terms menorrhagia and metrorrhagia are symptomatic only. Since no precise explanation for the mechanism of normal menstruation is generally accepted, it is impossible to describe causes for pathological deviations. The conception of endometritis and metritis has had considerable vogue, but is not generally accepted. The term "Metropathia Hemorrhagica" is extensively used but is still undefined. The author accepts as a working classification: 1. That of young virgins, Kelly, Gauss and Friedrick speak enthusiastically of radium in this type, and claim to induce a temporary amenorrhea followed later by normal menstruation. Koenig is fearful and has used it only twice with good results. He would use radium to induce sterility in tuberculous patients without hesitation. 2. Women in the midst of sexual life. In this class of patients radium is reserved for those where ordinary measures as curettage have failed, and hysterectomy is contra-indicated. Radium is prohibited in the presence of recent salpingitis, and is withheld by most operators where there is reason to suspect chronic pelvic inflammation. 3. Women approaching the menopause. Pathological hemorrhage may be due to: repeated child-bearing, previous infection, parenchymatous or vascular sclerosis, constitutional disease or ovarian dys-function. The uterus is slightly enlarged and boggy, the mucosa is usually hypertrophic, and the walls thickened. Curettage and many therapeutic measures have been used with unsatisfactory results. This is the ideal group for radium and this agent is the first choice. If properly used the risk is slight. The discomfort is not more than would be expected from the anesthetic and simple intrauterine treatment. The patients usually leave the hospital on the second or third day. Koenig prefers radium to the x-ray

GYNECOLOGY AND OBSTETRICS

SUPERVISORS:

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RADIUM THERAPY OF HEMORRHAGIC METRITIS EXCLUSIVE OF CANCER AND FIBROID OF THE UTERUS—M. Koenig, Geneva (Gyn. et Obstetrique, Rev. Mens., vol. 4): The author eliminates from his study all uterine bleeding due to cancer, fibroids, the puerperium, ovarian tumors, acute or chronic pelvic inflammation, or constitutional disease. He reviews the development of x-ray and radium therapy and credits Abbe with the original work with salts of radium used in the uterine cavity, in 1905. The biological action is studied in some detail. Abbe explained the effect of the B rays as a com-

at present. 1. It is most logical to use the therapeutic agent in the uterus and thus protect other structures. 2. Accurate diagnosis is possible. 3. Radium acts more promptly and the effects on the ovary are less distressing. 4. Radium therapy is more simple and can be used in any locality. 5. A single massive dose will destroy cancer if this be present and overlooked.

Results: Koenig reviews the results published by Gauss and Friedrick with from 94 to 93 per cent of cures, Clark with 35 cases and but one failure, together with those of many of the French workers. His own report includes 30 patients, most of whom were between 38 and 46 years and had received other forms of treatment with unsatisfactory results. Complete and immediate amenorrhea was obtained in 12 cases, the same after from one to three periods in 8, after from one to three profuse periods in 2. Normal menstruation was obtained in 3 and scanty periods in 4. One was a failure because a small dose was given in an attempt to preserve normal menstruation. This was subsequently cured by a single massive dose.

The author concludes that within proper limits of use, radium is a rapid and sure hemostatic in uterine hemorrhage not due to cancer, fibroma, neoplasm, or adnexal infection. It is inoffensive in women over 40 where the menopause is not objectionable. In these cases it is the treatment of choice to be used to the exclusion of all other gynecological measures. For younger women in whom the ovarian function is to be preserved, radium is to be used only where other measures have failed, at least till it is possible to exactly graduate the dose. Acute adnexal disease contra-indicates all radium therapy, and chronic pelvic infection prohibits any intra-uterine therapy.

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ROENTGENOLOGY

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ROENTGENOGRAPHIC PLEURAL ANNULAR SHADOWS IN PULMONARY TUBERCULOSIS—J. B. Anderson, Jr. (*Am. Review of T. B.*, Nov., 1921, p. 723):

Quotes Sampson Heise and Brown. (*Am. Rev. T. B.*, 1919, p. 664.) Partial Pneumothorax produced by lung softening and rupture.

Quotes Evans. (*Am. Roentg.*, 1919, VI, 50.) Ulceration or rupture of lung tissue so that air escapes into the area of pleuritis.

Quotes Honeij. (*Arch. Int. Med.*, 1920, XXV, 63.) Annular shadows are the result of adhesions between the parietal and parenchymal surfaces subsequent to inflammation.

Quotes Dunham and Hays. (*Trans. Nat. Tuberc. Assn.*, 1919, p. 324.) Autopsy records in two cases (1) large circular area of thickened, attached pleura overlying a

pyramid of caseation in the lung in which a cavity was found and (2) a cavity was underlying lesion.

Study consists of 50 annular shadows occurring in 36 cases. Tubercle bacilli in all cases. Of the 50 shadows, 19 were circular, 21 ovoid, 10 incomplete or irregular. Usually long diameter lay in horizontal plane of the chest. Rings vary greatly in density. Density within ring greater than surrounding pulmonary field in 17 cases, no great difference in 33, rarefied as compared with other lung markings 0.

In almost all cases lung markings made out beneath center of shadow. Inner border of shadow more sharply defined in 39 cases, borders equal in 11 cases. Outer border more sharply defined in 0.

In 13 cases there was a horizontal line suggesting fluid. (Proven to be fluid in 4 cases.)

Heavy striations, most of which extended to hilum, were considered thickened lymphatic trunks.

Shadows situated, 4 in contact with anterior chest wall between 2nd and 4th rib, 23 situated posteriorly mostly between 3rd and 8th ribs, 23 situated in planes of interlobar fissures. Majority, therefore, situated in planes of the pleura and in upper half of chest.

Changes in size observed.

Shadows occurred in presence of activity. Never seen to appear with retrogressive lesion. Also never became larger with latter condition.

In two cases in which pneumothorax was induced, adhesions were found at site of former ring.

Incidence of annular shadows (11 per cent to 20 per cent of consecutive cases) greater than incidence of spontaneous rupture.

Site of annular shadows does not correspond to the sites of most frequent rupture.

Annular shadows in upper portion of lung. Usually in cases of partial collapse, lower portion is involved. Symptoms of lung rupture lacking.

Roentgen characteristics of partial pneumothorax lacking. Lack of physical signs of pneumothorax. Some annular shadows may be localized pneumothoraces.

It is stated then that simple localized pleurisy is the basis of the annular shadow.

Rate of incidence of annular shadows is compatible with that of localized pleuritis.

Site of annular shadows (posteriorly at level of 7th or 8th vertebral bodies or in interlobar fissure) correspond with site of pleuritic changes.

Development follows pulmonary involvement.

Permanent residuum of annular shadow is a pleural thickening. Hypothesis then advanced, with diagram to show formation of area of pleuritis which advances to any given size with subsequent healing from the central portion and shrinkage, leaving finally only the thickened pleura. Explanation made of fluid level which shifts with change of position.

Experimental reconstruction of a localized pleurisy in vitro.

T. A. PEPPARD.

ROENTGEN RAY INTOXICATION—II: A study of the Sequence of Clinical, Anatomical and Histological Changes Following a Unit Dose of X-rays. S. L. Warren and G. H. Whipple. (Jour. of Exp. Med., Feb., 1922, p. 203.)

This paper follows the progress of pathological changes following the initial exposure to Roentgen rays.

In the first twenty-four hours there is a slight increase in urinary nitrogen, but not to any marked degree until the day before death. This nitrogen output does not in any way follow the very slight clinical manifestations which may appear. While usually there are no apparent symptom manifestations of x-ray reaction within the first twenty-four hours, there are definite histological changes in the epithelium of the crypts of the small intestine, as well as slight changes in the bone-marrow, lymphatic structures and the ovaries.

The appearance of clinical symptoms in the second twenty-four-hour period coincides with the appearance of cell changes within the epithelium of the intestine. The epithelial covering of the crypts is first affected, with necrosis and ecchymoses, but the epithelium of the villi at this time is still intact and in apparently good condition.

In the third twenty-four-hour period, clinical symptoms, diarrhea, emesis and weakness become much more pronounced. These symptoms are accompanied histologically by an inflammatory reaction of the entire small intestine, while the epithelium of the villi disappears, with edema and necrosis, and a gradual progress of intoxication.

The very severe clinical reaction of the fourth day is rapid onset of severe intoxication, which may be considered as due to absorption of toxic necrotic tissue and possibly secondary infection. While there is no evidence of any stomach involvement, there are some slight changes in the colon. As in the previous paper, the conclusion is drawn that the post-x-ray reaction is due to the primary injury of the epithelium of the small intestine.

This paper contains post-mortem reports of dogs sacrificed, 2, 24, 48, 72, and 96 hours after lethal dose of Roentgen rays over the abdomen and numerous reports of histological studies of tissues obtained at necropsy.

A. U. DESJARDINS.

BOOK REVIEWS

BOOKS RECEIVED FOR REVIEW

CLINICAL TUBERCULOSIS. Frances Marion Pottenger. C. V. Mosby Co. Vols. 1 and 2.

THE MECHANICS OF THE DIGESTIVE TRACT. Walter G. Alvarez. Paul B. Hoeber. \$3.50.

ANNUAL REPORTS. U. S. Public Health Service. 1921.

PUBLIC HEALTH REPORTS. 1916-1917-1918. Reprints Nos. 406-146-498-505-421-410-522-426-394-390-285-231-547-551-439.

ABDOMINAL PAIN. Dr. Norbert Ortner. Rebman Co.

THE PHYSICIAN HIMSELF. D. W. Cathell, M. D. Cloth. Published by author, Emerson Hotel, Baltimore.

THE PLACE OF VERSION IN OBSTETRICS. Irving W. Potter, M. D., F. A. C. S., Buffalo, N. Y. C. V. Mosby Co. \$5.00.

RADIUM THERAPY. Frank Edward Simpson. St. Louis. C. V. Mosby Co. \$7.00.

MANAGEMENT OF THE SICK INFANT. Langly Potter, M. D., St. Louis. C. V. Mosby Co. \$7.50.

OPIATE ADDICTION—ITS HANDLING AND TREATMENT. Edward Huntington Williams, New York. The MacMillan Co. 1922.

THE HEALTHY CHILD FROM TWO TO SEVEN. Francis Hamilton MacCarthy. The MacMillan Co. 1922.

PRACTICAL INFANT FEEDING. Lewis Webb Hill, M. D., Philadelphia. W. B. Saunders Co. \$5.00.

THE THYROID GLAND—Clinics of Geo. W. Crile, M. D., and associates at Cleveland, Ohio. W. B. Saunders Co. Philadelphia. \$5.00.

SURGICAL AND MECHANICAL TREATMENT OF PERIPHERAL NERVES. Byron Stookey, M. D. W. B. Saunders Co. 1922. \$10.00.

NEW AND NON-OFFICIAL REMEDIES. 1922. A. M. A.

1921 COLLECTED PAPERS OF THE MAYO CLINIC, ROCHESTER, MINN. Philadelphia and London. W. B. Saunders Co. 1922. \$12.00.

THE THIRTEENTH AMENDMENT. Charles Taber Stout. New York. Mitchell Kennerly. 1921. \$1.50.

FOUR PAMPHLETS—FEMALE WEAKNESS, 15c; EPILEPSY "CURES" AND TREATMENT, 15c; OBESITY CURES, 15c; THE NOSTRUM AND THE PUBLIC HEALTH, 10c. Propaganda Dept. A. M. A.

THE HEART OF THE ANTI-VIVISECTIONIST. C. S. Bluemel, M. A., M. D., L. R. C. P. (London), M. P. C. S. (Eng.). Denver. Colorado Association for Protection of Public Health.

ANNUAL REPORT. Medical Dept. United Fruit Co. 1921. Boston. W. M. Leonard, Inc.

THE LOGIC OF THE UNCONSCIOUS MIND. By M. K. Bradby. Cloth. Pp. 304. London: University Press.

In this volume the author delves deeply into the realms of the human mind and endeavors to shed light in regions hitherto unexplored. As his introduction he writes upon Formal Logic, analyzing ancient and modern thought. The book proper is divided into three parts.

Part 1 deals with the unconscious background to conscious reasoning. In it he treats instinct and intuition, taking up dreams and unconscious symbolism and language, with some of the relations of language and logic.

Part 2 takes up fallacy, with classification of fallacies and analyses of some cases. Unconscious motives are the source of fallacy.

Part 3 deals with logic as applied to life, touching upon social problems, education, love, religion and spiritualism in their relationship to logic.

He very aptly concludes with a chapter called "Progress."

This work does not appeal to all but appeals to those taking interest in motives underlying human thought and action.

W. H. HENGSTLER, M. D.

INFECTIOUS DISEASES. A Practical Textbook. By Claude Buchanan Ker, M. D., Ed. F. R. C. P., Ed. Medical Superintendent, City Hospital, Edinburgh, and Lec-

turer in Infectious Diseases to the University of Edinburgh; Major, R. A. M. C. T. F. Cloth. Price, \$14. Pp. 627, with 90 illustrations. London: Oxford University Press, 1920, Second Edition.

The author's purpose is to lay before the reader the practical side of the subject of infectious diseases. Bacteriology and pathology have been discussed only in those diseases where they have a clinical application. The great questions of diagnosis, prognosis, and treatment, however, have been gone into in detail. There is little reference to the literature, as the volume is rather a record of personal experience to which has been added material of recognized value from the best sources.

Because of the large amount of work done on infectious diseases since the publication of the first edition, extensive alterations and additions were necessary and several portions have been entirely rewritten.

The author devotes the first thirty pages to a discussion of the many points common to all infectious diseases, their management, and treatment. Then follows a discussion of measles, rubella, scarlet fever, smallpox, typhus, enteric fever, diphtheria, erysipelas, whooping cough, mumps, cerebral-spinal-meningitis, and then he takes twenty pages for the discussion of the problems of "fever hospitals."

A chapter is allotted to each disease, and each is begun with a careful outline, which is rigidly followed. This facilitates immediate reference, not only to a given disease, but to any particular phase of it.

The plates are well chosen, and make possible useful mental pictures of typical conditions. The temperature charts accompanying each chapter show the characteristic temperature variations of that particular disease with relation to prodromal symptoms, the appearance of the eruption, and the development of complications.

HAROLD E. RICHARDSON, M. D.

THE PSYCHOLOGY OF THE SPECIAL SENSES AND THEIR FUNCTIONAL DISORDERS. By Arthur F. Hurst, M. A., M. D. Oxon, F. R. C. P. Physician and Neurologist to Guy's Hospital. Cloth. Pp. 122. London: Oxford University Press. 1920.

A little volume of ten chapters in which the author deals with hysteria and its associated phenomena. His work is

based on observations while in the army, in which he was assisted by a number of associates.

He first discusses hysteria as an entity and then takes up and treats its various phases, including anesthesia, hyperesthesia, pain, deafness, blindness and hyperacusis.

His observations are interesting and unique in some instances and will doubtless prove valuable to those seeking information along this line.

W. H. HENGSTLER, M. D.

INFECTIONS OF THE HAND. By Allen B. Kanavel.

That Dr. Kanavel's "Infections of the Hand" is a masterpiece is well known by every physician. The present revision has given the author the opportunity of supplementing the text with the knowledge of gas bacillus and streptococcus infections gained during the great war, as well as adding a chapter upon the restoration of function in infected hands.

The book begins with the experimental and anatomical studies upon which the deductions are founded, giving the reader a clear understanding of the basis for surgical procedures.

Two chapters include diagnosis and treatment in general which indicate into which group a particular case will fall and will direct the surgeon to the proper section of the book where cases of that nature are discussed more in detail.

The diagnosis and treatment of tenosynovitis is emphasized and dealt with at length, giving also the differential diagnosis.

The relation between the synovial sheath and the fascial spaces is demonstrated by experimental injection of the outlines, boundaries and diverticula of the fascial spaces. This relationship is also brought out by plates of serial cross-sections of the hand at different levels which are very instructive.

This book can well be recommended as an asset to any surgeon's library.

ARNOLD P. GRUENHAGEN.

For Sale—Southern Minnesota \$5,000 general practice; no hospital or surgeon; good possibilities for both with general practice; modern town 2,000; prosperous farming section; collections 98 per cent; competition ethical; \$2,000. Address B38, care MINNESOTA MEDICINE.

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NO. 8

ORIGINAL ARTICLES

A GENERAL DISCUSSION OF FRACTURES BASED UPON MY PERSONAL EXPERIENCE*

W. H. MAGIE, M.D.

Duluth, Minn.

This paper is to be a short résumé of my experience extending over a period of thirty-seven years, in the diagnosis and treatment of fractures. I do not expect to completely cover the field of fractures and their treatment—it is too large a one to undertake in a paper of this kind—but merely to detail in a fragmentary way my experience. I will show by the lantern slides a few specimens of fractures of the different bones and at the same time I wish to lay particular stress upon the inability to diagnose many fractures without the aid of the x-ray; particularly is this true in fractures of small bones of the hands and feet. There can be no hard and fast rule to apply to the treatment of all fractures or even a limited class of fractures, such as the fracture of the long bones, namely, the femur, tibia, fibula, humerus, and bones of the forearm. Every fracture must be studied from its own individual standpoint. For instance, there is no hard and fast rule of treatment that we can apply to all fractures of one bone, such as the femur.

There are many varieties of fractures of the femur, namely, fracture of the head, fracture of the neck, both intracapsular and extracapsular, fracture of the shaft, transverse, oblique, longitudinal and spiral fractures and fractures of the condyles, etc. Each fracture is a problem that must be solved and treated in the manner that one's experience has taught him is the best. Opinions and practice based upon one's own experience are methods one will be most likely to adopt. Knowledge gained by experience is the most trustworthy and should be adhered to and will surely give the best results if you have the courage of your convictions and act accordingly, although at times it seems to conflict with opinions of others in high authority in the

same line of work. We will take, as an example, a fracture of the neck of the femur; there are many methods employed in the treatment of this fracture. It does not matter what method we employ in getting the best possible union, results are of more importance than methods. I may not be able to obtain the same good results by a method that you employ as I would with a method that I have employed many times. Therefore, I should confine my treatment to methods that have proved most successful in my hands.

Probably the most common dressing for fractures of the femur has been a plaster of Paris cast. The use of plaster of Paris as a fixing and immobilizing dressing was introduced about forty years ago and still holds its position as a first choice dressing, with most surgeons, in fractures of the femur. This dressing has been a very satisfactory one in my experience. In the treatment of fractures of the lower end of the femur, I have found the Hodgen splint very satisfactory; as you know, this splint is a very simple one, in which the limb is elevated free from the bed after having first fixed the foot to the splint with a Buck's extension of adhesive. The leg is flexed upon the thigh. This position at once relieves the pull on the lower fragment, when it will automatically drop into place. The extension is kept up by a simple method of traction, made by the attachment of ropes passing from the splint over a pulley placed in the ceiling.

There are cases in which open operation will be necessary, in order that reduction may be accomplished. Then it will become necessary to choose one of several methods to fix the bones and hold them in position. For many years, I depended upon nails or wire for binding together the fragments. Silver wire was very satisfactory in many fractures that were oblique, spiral or longitudinal in character. Ivory pins or pegs were used often, but not always as satisfactory as nails or wire. Later on, the Lane plate was introduced and used with more or less success; it became, in fact, a real fad with the younger disciples of surgical art and was more often used unnecessarily than necessarily. Its popularity with the younger surgeons was undoubtedly due to its spectacular effect. The Lane

*Presented before the Minnesota Academy of Medicine, St. Paul, March 8, 1922.



Plate No. 1.—Unreduced fracture of femur four weeks after receipt of injury the sort that the use of a Lane plate is justified.

plate was not easily encapsulated on account of its size; it became, therefore, an irritant or foreign body, which nature tried to throw off eventually, making its removal, in many cases, necessary. A very frequent and unhappy result was failure, or a delayed union. This failure of union has been attributed to the perfect immobilization of the fragments. I do not agree with this explanation, for I am convinced that delayed or non-union is due to the great detachment of the soft parts from the bone in placing the plate directly upon the bone. The bone derives its nourishment, to a large degree, from the small blood vessels that pass from the soft parts through the periosteum into the bone. Therefore, when the soft parts are detached to a considerable extent, the bone is deprived of a large part of its nutrition, and this would naturally retard its union. I have often found delayed union in very badly displaced fractures of long bones that had been stripped of their soft parts by the trauma produced at the time of the accident. These were cases that made an open operation necessary, in order to obtain a reduction. Although these cases healed by primary union without infection, there was often delayed or non-union. I am convinced that there are a few cases of fractures of the femur in which a Lane plate, properly applied, offers the best chances of getting good union in the best possible position. In making the selection of the Lane plate, one should choose a smaller sized plate, as I believe that the less metal left in the wound, the better. In most of the cases, however, I have found screws made from stove bolts to answer the purpose very well, often with the help of silver wire

wound around the bone, binding the fragments together. The stove bolts are screwed in at right angles to the shaft, usually passing through the bone, and cut off with a strong pair of nippers, flush with the bone. I first used nails for uniting fracture of the femur as far back as 1891. My first experience was in an old case of ununited fracture of the condyle of the femur. The internal condyle had been almost completely broken off. The fracture was a longitudinal one extending up about five inches, the fragment being held by a small base to the shaft of the femur. The condyle was very loose and could be moved around freely in the joint. The joint was widely opened by a horseshoe flap, exposing the fracture; curetting the fissure thoroughly, in order to leave good healthy bleeding bone, I drove an ordinary twenty-penny wire nail through the internal condyle, nailing it to the opposite one, or external condyle. The nail penetrated the external condyle, passing through one inch; then it was cut off flush with the bone and joint irrigated in a solution of mercury bichloride, and closed tightly without drainage. The healing was by first intention and the union of the fracture complete in about three months, and when discharged from treatment his joint was almost perfect, he being able to flex his leg on his thigh to a right angle. The result in this case was so satisfactory that I was encouraged to resort to nails quite often in fixing bones. Vary rarely have I found it necessary to remove nails or screws. They become encapsulated quite readily and cease to be an irritant. I have used aluminum bands in very

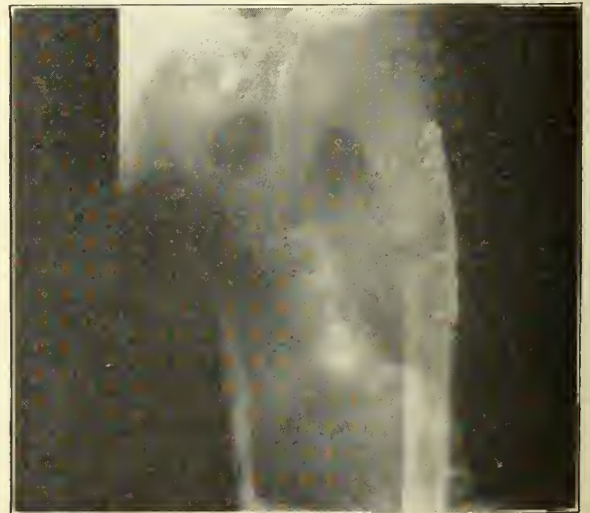


Plate No. 2.—Open reduction and application of Lane plate. Same as No. 1.

oblique fractures with success. The only objection that I have found to these metal bands is the tendency they have to produce an unusual amount of callus. This callus is often of long standing, is removed very slowly by absorption and is liable to incarcerate important nerves, particularly in fractures of the humerus.

I have had some experience in bone grafting in fractures that have failed to unite. After treatment for ten or twelve months by the usual methods, I have used an inlay taken from the healthy tibia, held in place by bone screws made from the same tibia. This method has been very satisfactory and has caused a rapid union of the ununited bone. In preparing the diseased bone for the reception of the insert, we have found a very rarefied and softened condition of the diseased bone in the neighborhood of the fracture.

The treatment of fractures of the leg has been greatly simplified since the introduction of the steel pins of Steinmann, which are used to make extension of the leg. These pins are of various lengths and are passed through the os calcis. I prefer the pins to the tongs, as they secure a better and firmer hold of the os calcis. Since I have adopted the use of the pins, I find that it has not been necessary to make open operation as frequently as before. After as good a reduction has been made as possible, under either a general or local anesthetic (I find local is satisfactory in many cases), and a movable splint applied so that the splint can be removed daily and fracture examined, the fractured fragments can be massaged into place by degrees. With patient treatment, these badly comminuted

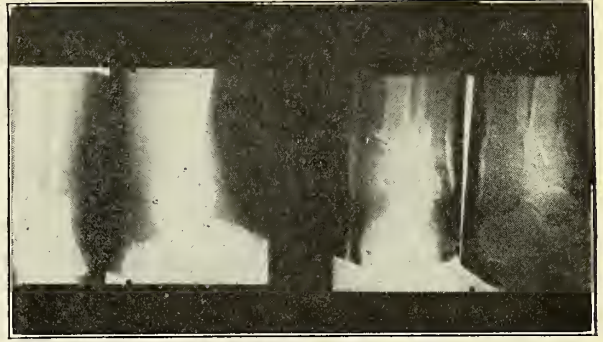


Plate No. 4.—Fracture of tibia and fibula, fragments maintained in position by use of screw.

fractures can be nicely adjusted, insuring a very satisfactory result.

During the last five years at the Morgan Park Hospital, I have treated twenty-eight fractures of fibula and tibia, forty of the fibula, thirty-six of the tibia, twelve of the femur, nine of the humerus, ten of the ulna and radius, sixteen of the radius, thirteen of the ulna, one of the pelvis, eight of the skull and three of the spine. I have treated one hundred and three cases of fractures of the small bones of the hands and feet. Out of these fractures of the small bones, for example, in the metacarpals and carpals of the hand, very few have been recognized as fractures without the aid of the x-ray. In other words, we could not elicit physical signs of fracture and many were not even suspected as being fractures; but as a result of our practice of taking x-rays for the purpose of making a record of the case, we have discovered, you might say, accidentally that there were fractures present. These cases have practically all been compensation cases that have received injuries at the works of the Minnesota Steel Company. It is, therefore, very important that these fractures should be discovered in order that we may be able to estimate the amount of disability that is liable to follow an injury of this kind. Then it is necessary, in order to protect ourselves against charlatans, both in the profession and outside, who are anxious to assist many of these cases in getting unjustified compensation—that is, compensation for injuries that did not exist. As an illustration, I will take a case of an employe of the Minnesota Steel Company, who had received an injury to his wrist. The injury consisted of a simple sprain and, in accordance with our practice, we made an x-ray picture and found there was no evidence of fracture of the bone. After some weeks of disability, on account of the sprain, he presented

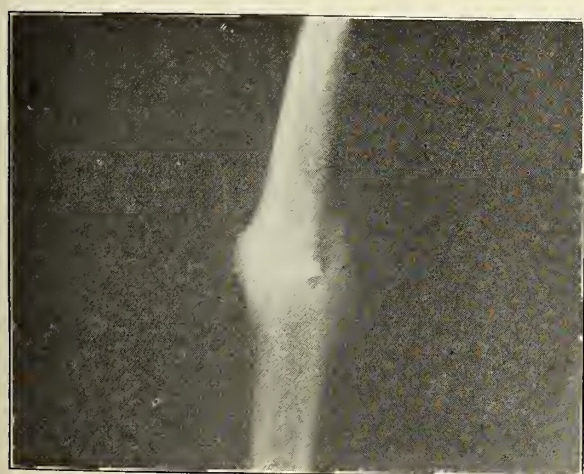


Plate No. 3.—Excessive callus production following use of aluminum band.

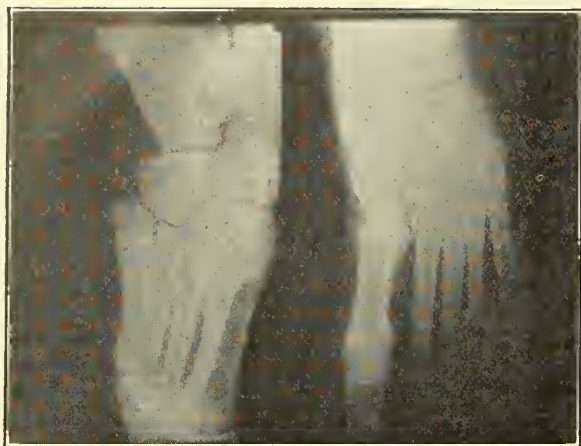


Plate No. 5.—Jones fracture involving tuberosity of fifth metatarsal. Not recognized.

himself with a series of insurance papers. He was carrying insurance in several lodges and he suggested that, in order to get any money, it was necessary to get a report that the arm was broken, because the lodges that he belonged to would not pay for a sprain. Of course, we did not accede to his demand, but we heard later that he had consulted another physician, who had certified that his arm had been broken. This same patient came into the hospital some months later with a contusion over the collar bone; examination showed no sign of fracture; we also x-rayed the case and found no sign of fracture. Some weeks later he returned with an x-ray plate, taken by a physician nearby, who claimed that his collar bone was broken and he demanded compensation on account of the fracture of the collar bone. On inspection of the plate, we discovered what they thought was a fracture of the collar bone was the outer articulation of the clavicle with the acromion process of the scapula. As you know, this is united by cartilage together with strong fibrous ligaments that do not show up in the x-ray. This was pointed out to us as the seat of the fracture. We soon convinced him that there was no fracture, and that this appearance was a natural condition at this articulation. In all probability, he returned to the same physician, who filled out his insurance papers before certifying to a fracture of the clavicle.

In the industrial department of the Morgan Park Hospital, we come across these cases frequently. The treatments of fractures of the small bones of the foot are very simple, indeed; the patient usually rests in bed for a few days with hot fomentations applied until the swelling is reduced, then a plaster

Paris cast applied; they are then discharged from the hospital and are allowed to go about on crutches. Fractures of the carpus and the metacarpus are easily adjusted and easily held in place by splints of metal and yucca wood, as are also the fractures of the phalanges. There is usually very little displacement of the fractures of the metatarsal and metacarpal bones; this probably accounts for the inability in many cases to make a diagnosis by ordinary methods and without the use of the x-ray. We will show you by lantern slides a few examples that were not recognized before the x-ray was taken.



Plate No. 6.—Fracture of second metatarsal unrecognized by medical attendant, patient worked at hard labor for period of three weeks. X-ray showed the fracture with no sign of healing. Union was prompt after proper treatment.

My experience in the treatment of fracture of the skull, extending over a period of thirty-five years, would include the treatment of about one hundred and fifty cases. Most of these men were injured by limbs of falling trees, while working as lumberjacks in the woods when the woods were near to Duluth. We would have ten or twelve injuries of this kind every year. Many of these fractures were very extensive and quite a few of them compounded. It has been our custom to make extensive flaps of the scalp and bone, widely exposing the dura, in order to remove blood clots and any displaced bone that may be causing a pressure upon the brain and at the same time securing bleeding vessels. In fractures that extend into the frontal sinus or into the petrous portion of the temporal bone, we place a drain, which is, in my opinion, a very important factor in the cure of these cases. Many of these cases seem to have almost entirely recovered from the injury and are perfectly normal mentally, when, after about a week or ten days, they suddenly develop meningitis, due, of course, to the extension

of the infection from the sinuses into the cerebro-spinal fluid. For drains, we have used decalcified chicken bone to some extent, but mostly have depended upon a wick made of coarse catgut, leaving it in situ. This does away with the necessity of removing the drains. The chicken bone is finally absorbed, as is the catgut. I have found these very satisfactory drains in the fractures of the skull that need drainage. Then, a later complication that we have encountered is abscess of the brain. The patient recovers completely, to all appearances, from the fracture of the skull or brain injury, whatever it may be, but about three weeks or even later he begins to show symptoms of abscess of the brain. I believe that drainage in cases of fractures, where fractures extend into the frontal sinus or petrous portion of the temple bone, will frequently prevent the development of meningitis, as well as abscess of the brain.

I want to say a word about fracture of the spinal column involving the cord. In my early experience, we allowed all our broken-back men to die without attempting any operation. Some fifteen years or more ago, I adopted a method of operating upon all cases of fractures of the spine involving the cord. I have made twenty laminectomies in cases of this kind. Three recovered and one recovered as far as preserving life is concerned, but the patient is permanently paralyzed from the seat of the injury down and, in my opinion, will always remain so. The other three recovered to such an extent that they were able to walk again by the use of a cane when I last heard from them. I don't believe that it is always possible to judge before the spinal cord is exposed whether it has been completely severed or not. It seems to me that if the pressure by bone of the broken arch is sufficiently made upon the cord that it would produce complete paralysis and, at least in one of my cases, we found that the cord was compressed by a smooth piece of the broken arch and after the pressure was removed he soon began to show signs of movement in his limbs and finally recovered sufficiently to walk with the aid of a cane.

The fractures that often produce the most serious complications are fractures of the pelvis. This is particularly so in the fracture of the pubic portion in which a sliver of bone divides the urethra. This accident produces a condition that often proves fatal when not immediately recognized and overcome by prompt operation. This is a condition that is easily diagnosed. There is no excuse for a physi-

cian of average experience and intelligence to fail to make a diagnosis before the urinary infiltration has taken place in the perineal region; however, many cases go undiagnosed and die from urinary infiltration and sepsis. The inability to pass a catheter together with the dribbling of a little blood or bloody urine from meatus following a receipt of an injury is sufficient to suspect at least a rupture of the urethra.

I will say, in closing this paper, that to obtain the best results it is necessary to make good use of the *x-ray*; at the same time remembering that *x-ray* pictures are not photographs of bones, but that they are photographs of shadows of bones and that these shadows are often distorted in such a way that correct interpretation is sometimes difficult and often deformities are greatly exaggerated as they appear on the plate.

RECENT DEVELOPMENTS IN X-RAY APPARATUS* *

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During the last few years such important physical and technical advances have been made with the aid of the *x-rays* that it might not be far from correct to class the discovery of Professor Roentgen as one of the most important of the last quarter of a century. Aside from the enormously useful field of application which the *x-rays* have found in medicine, we have to credit to this discovery our present definite knowledge of the structure of crystals, the arrangement of the atoms and molecules in solids, a method of identifying the atoms and of classifying them, from their *x-ray* spectra, in a periodic series, a method of studying the structure of metals and alloys and finally the use of the *x-rays* for sterilizing substances such as tobacco, cheese, etc.

This very interesting as well as useful subject has engaged many and the best workers in the field and very rapid technical advances are therefore not surprising. There is an interesting sequence of improvements in *x-ray* tubes, and in step with these followed improvements in the design of *x-ray* apparatus. In fact, even a superficial inspection of a

*From the Research Laboratory of the Wappler Electric Co., Inc.

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modern machine suffices to convince anyone that it is a highly specialized apparatus, designed and constructed in accordance with definite and specific intentions.

Here arises the question: What are the given conditions to which an *x-ray* apparatus must conform, or what are the specifications for an engineer who is charged with the design and construction of an *x-ray* apparatus? In arranging the subject of this lecture, I found it convenient to divide it into the headings: (1) radiographic, (2) physical or technical, (3) engineering or commercial requirements.

RADIOGRAPHIC REQUIREMENTS

Considered from the *radiographer's* standpoint, the most essential requirement is that the apparatus be safe in respect to fire risk, break-down and accidents which might bring the patient or the operator into danger. A designing engineer must therefore be acquainted with practical radiographic work, with medical practice and with actual conditions under which the apparatus is to be used; he must therefore be able to place himself in the position of the roentgenologist and he should know what conditions may arise in the *x-ray* laboratory and how accidents generally occur. Imagine, for instance, that a patient in great agony is brought into the *x-ray* department. There he is placed on the *x-ray* table and is to be turned into several different positions, and, while orderlies or nurses may be busy in the same room, it is necessary to pass from 50 to 100 milliamperes of current at from 40,000 to 60,000 volts through the tube, which is generally at a distance of from 10 to 15 inches from the patient. If you, as electrical engineers, would see a nervous and restless patient under such conditions, you would probably immediately begin to think of safety devices and to figure out what protection should be provided against the accident which would result if the patient should move an arm or a leg and come in contact with the tube or one of the high tension wires; or if a patient is not examined in the hospital, but is in the doctor's private office, it very often happens that "to have someone's *x-ray* picture taken" is a family affair which is generally well attended by the relatives of the patient. The ways in which these people manage to come in contact with the high tension wires are really ingenious. Thus, we have only to consider such hidden dangers as the wire construction of women's hats and the tinsel fabrics in their clothing, which are all excellent conductors of high voltage electricity. More-

over, it is impossible to consider lightly the effects of giving shocks to bystanders, especially since, in the present era of highly developed legal skill, such accidents very often prove efficient in extracting damages which are then alleged to have been due to negligence on the part of the roentgenologist.

But it is not an electrical engineer making such *x-ray* exposures; this work is performed by a medical doctor, who, as a rule, is unfamiliar with engineering subjects or the physics of electricity; his interest is centered primarily on the patient; thus, he generally forgets all directions and instructions which may have been given to him by the manufacturer who installed the apparatus. For that reason, *x-ray* apparatus must be constructed so that their control gives as little chance for error as possible, and, in addition to this, the installation must be such that the operator has the patient and the high tension current carrying part of the wiring in full view while the current is applied, so that in case of danger or accident he is ready to pull the controlling switch and stop the current.

A modern *x-ray* laboratory is generally arranged so that the operator and the patient are protected as much as possible against the rays. The control board is usually located behind a lead-lined panel or in a lead-lined booth provided with a lead glass window through which the operator can observe the patient and the tube. Numerous safety devices have been suggested, but, while some of them may offer some protection, they all suffer from the serious defect of not being absolutely dependable. Hence, the sense of false security created through the use of such safety devices makes it very doubtful whether it is not better that the operator be fully aware that he is controlling a current which under certain conditions may be very dangerous to life, as it is practically equal in power to that used, for instance, in the New York State Prison for electrocution, rather than to have him depend on the less reliable protection afforded by mechanical or electrical devices.

For the direct visible examination of patients with the fluoroscopic screen, there is, as a rule, less electrical energy required and consequently the dangers appear to be less; nevertheless, there are a number of deaths on record, which have occurred in the fluoroscopic room, so that here again absolute protection against high tension shocks is necessary. The fluoroscopic room must be darkened during the examination; the noise of the *x-ray* machine and the nitric fumes produced by the high tension

current causes many patients, especially those of the anemic type, to faint. Protection against the possibility of high tension shock is therefore as important in the fluoroscopic room as it is in the regular *x*-ray laboratory, where ordinarily larger energies are applied to the tube.

A still greater problem for providing protection against the *x*-rays and the high tension current is presented in the modern therapeutic *x*-ray laboratory. In the crusade against cancer, the *x*-rays seem to be one of the important effective weapons against that disease, if it is not too far advanced. *X*-ray therapy has been practiced in this country for a number of years and apparently with good results, at least for the treatment of superficial cancer or similar superficial malignant or semi-malignant diseases. The use of radium, which was very strongly advocated during the last decade, seems to have proven somewhat of a disappointment except in some cases where the radium needles can be introduced directly into the diseased part. But, when the malignant growth is located beneath the skin or deep in the tissue, the rays of radium do not seem to prove efficient in destroying the disease.

X-rays can be produced with sufficient penetrative power and in sufficient quantities to enable one to deliver a destructive dose even to deeply located malignant growths. The main difficulty, however, arises in protecting the part through which the rays enter against overdose, for the incident dose is always considerably larger and more effective than the dose delivered to the part located deeper in the tissue.¹ Physicists have faithfully collaborated in this work and they have made careful studies to determine what quality of rays would be most suitable to obtain the desired destructive effect on the deep-seated growth without at the same time injuring the surface layers and the skin through which the rays must pass. When the action of a given *x*-ray radiation is considered proportional to the fraction absorbed in the tissues, it is calculated that voltages between 80 and 100 kilovolts would be most adequate for delivering to a deep-seated tumor the largest dose which can be given without overdosing the skin layers. Thus, until about three years ago, practically all *x*-ray treatment of deep-seated cancer was given with potentials ranging between 80,000 and 100,000 volts.

With the termination of the European war, re-

ports came from abroad to the effect that much better results could be obtained with voltages considerably higher than those used in this country. In fact, it is reported by roentgenologists who have visited European clinics that the surgeons in charge of some of those clinics have discontinued taking surgical procedure against certain kinds of cancer and prefer to send their patients to the *x*-ray laboratory for treatment, where, as the reports stated, they are in most cases actually cured. In fact, the routine there seems to be, first, the application of *x*-rays and then, if the desired result is not obtained, surgery is resorted to. The theory advanced by these roentgen physicists is that the higher penetrating rays produce more scattered radiations and that, contrary to the belief of American physicists three years ago, the effects of the *x*-rays in deep therapy are not entirely due to the absorbed portions, but rather to the portion scattered in the tissues.²

Quite a number of roentgenologists in this country have tested this new method. Their results in general seem to confirm the European reports and thus clinical results have shown a new direction. Since then physical measurements on scattered radiations have been in progress in this country and so far it has been shown that as much as from 60 to 80 per cent of the effects of highly penetrating radiations are due to radiation scattered in the tissue.

Under these circumstances, a new problem arose for the *x*-ray engineer—that of constructing an *x*-ray transformer producing and rectifying a high tension unidirectional current of from 250,000 to 300,000 volts. This is a difficult task and the requirements for insulation and safety are indeed difficult to fulfill, but a solution to the problem was found in the new type deep therapy machine, several of which have now been in operation for many months, delivering from 5 to 8 ma. at from 260,000 to 280,000 volts peak value.

PHYSICAL REQUIREMENTS

The preceding remarks are made with the inten-

²It is now known that the effects of an absorbed radiation can be expressed as the sum of two factors

$$\mu = \beta + \sigma$$

β being due to the energy absorbed in accordance with the classical absorption law ($I_t = I_{0e} - \lambda t$) and σ the part which is scattered in the mass of the tissue. The older calculations of dosage were solely on absorption (β) and the scattering effects (σ) (which seem to be most pronounced with the higher penetrating rays) were neglected; but studies on scattered radiations are now in progress.

¹Attention is called to the necessity of correct dosage because a small dose which is insufficient to destroy the cancerous growth, may stimulate its vitality; hence an insufficient dose may, under certain conditions, be more harmful than useful.

tion of showing that the roentgenologist's requirements must be fully considered by the designing engineer. So far I have omitted all reference to *physical* or *technical* requirements and those which might be considered as having originated in connection with the x-ray tube. But, as a rule, improvements in x-ray apparatus have been preceded by improvements in x-ray tubes. So, for instance, the old type platinum target tube was energized from the now discarded induction coil; then followed the invention of the tungsten target tube, which permits a much larger energy input. This gave an impetus to the engineers and resulted in the creation of the modern transformer rectifier type machine. Again, when the various types of hot cathode tubes had been fully worked out, some new accessory apparatus came into use, and finally, when the new deep therapy tube was perfected, there were again new requirements and another new type of apparatus was promptly designed and developed. These cases illustrate the fact that engineers have solved the new problems as promptly as they arose or as soon as the requirements and specifications were definitely formulated and presented to them. It is therefore in a way surprising that the literature contains nothing like a set of specifications which might serve as a guide to engineers in constructing x-ray apparatus. In preparing this paper, therefore, I undertook to enumerate some of the most important requirements, and I hope that I succeed at least in pointing out the direction in which some of the still existing problems might be solved.

From the fact that an x-ray machine converts energy taken from the power supply line into such energy as is suitable for the production of x-rays, it follows that the required electrical characteristics of the current produced, i. e., its curve form, voltage, power factor, etc., are determined entirely by the characteristics of the tube. A designing engineer must therefore be fully acquainted with the physics of the x-ray tube, or there must be a physicist who can describe definitely the kind of current which must be produced. In the following we shall consider briefly the two types of x-ray tubes now in use, namely, the ionic or gas containing tube, and the electronic or high vacuum tube, of which the Coolidge and Lilienfeld tubes are examples.

The gas containing tube is still used extensively because of some of its properties and characteristics which make it very valuable and in certain respects preferable to the electronic tube, although it is a

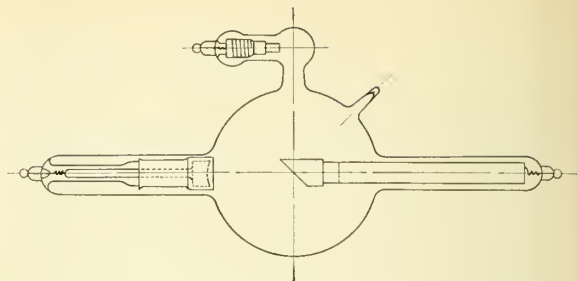


Figure 1. Tonic or gas containing x-ray tube.

little more difficult to operate. A gas containing tube, shown in Figure 1, consists of two principal electrodes and an air-tight envelope, usually of glass, which, of course, must be a good dielectric to prevent discharges through it or along it, and which must enable one to evacuate and maintain the tube at the required degree of vacuum. The electrode to which the negative potential is applied is spherically curved, the curvature being approximately focused upon the second electrode, which faces it and which is placed at a distance of about 3 to 4 inches away from it. There are a certain number of gas molecules left in the evacuated space as well as a number of ionized positive and negative gas particles, and when a difference of potential is applied the positive ions are attracted toward the negative electrode. When impinging there they give off their charge and cause the release of electrons. These electrons are then accelerated in the electric field and by virtue of the curvature of the negative electrode are caused to impinge upon a small area on the other electrode, which faces the discharge. The opposing electrode, which is generally called the anticathode, consists of a tungsten surface which abruptly stops the electrons and thereby excites the x-ray radiation. The tungsten target is mounted on a block of copper which rapidly carries away the heat generated on the target through the electronic bombardment.³

The frequency of the impact of the ions on the cathode is proportional to the strength of the electrical field and therefore proportional to the voltage applied to the tube. The tube therefore obeys Ohm's law except that the voltage factor, being a kinetic energy or a velocity component, must be squared. The current therefore increases with an increase in the voltage applied to the tube and at the same time the velocity of the electrons through

³A third terminal is provided so that by shunting some current through it a certain amount of gas can be liberated until the degree of vacuum is properly adjusted.

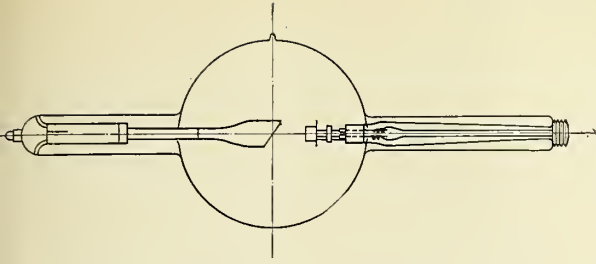


Figure 2. Electronic (Coolidge) x-ray tube.

which the x-rays are produced increases so that, by applying higher voltages to the tube, rays of proportionally higher penetration and in greater quantity are produced.

The second, or electronic tube, known as the Coolidge tube (Fig. 2), also consists of two principal electrodes and a space limited by a gas-tight envelope; but this tube is evacuated to the highest degree possible. The release of electrons is therefore not obtained through the impact of positive ions upon the cathode, but it is produced from a heated surface in the cathode. The electrons emitted in the cathode are then focused electrostatically upon the second electrode, which faces the electron stream.

The characteristics of this tube differ from those of the gas tube in that, with rising voltage, the current increases very rapidly until it arrives at a so-called saturation condition, at which the current is then independent of the voltage applied to the tube and is therefore solely proportional to the temperature of the filament. This type of tube therefore does not obey Ohm's law or a modified form of it, but represents a rigid system which allows current to pass entirely independent of the voltage applied and determined only by the temperature of the filament.

The manner in which the tube current and the voltage across the two types of tubes change is shown in Figure 3, where curves a, b and c are obtained with a gas tube of three different degrees of vacuum and curves a', b', c' are obtained by plotting the square of the voltage against the milliamperes. The resistance of the gas tube therefore is of the type of Ohmic resistance, but in the formula for Ohm's law the voltage must be squared. The curves of the electronic tube a, b, and c were obtained with three different degrees of filament heat. The vertical parts represent the condition of saturation, and the tube current is therefore clearly shown to be independent of the voltage across the tube.

This brings us to the question of deriving some of the electrical conditions to which the current produced in the x-ray machine must conform, so that it will properly energize both types of x-ray tubes now in use. The gas containing tube will work perfectly well and regularly, provided its vacuum remains unchanged, but as soon as the electrodes become hot they release some of the gas occluded in the mass of the metal, with the result that the vacuum drops and the resistance of the tube decreases. In such a case, if the x-ray machine maintains a constant potential, irrespective of the tube current, the current through the tube will increase at the rate at which the vacuum drops and it may finally become large enough to either injure the target or crack the glass. In practice, however, it has been found that if there is sufficient Ohmic resistance in the primary of the transformer, the increased RI^2 loss in the resistance, in case the current tends to increase, will practically compensate and prevent the damaging of the tube. For this reason, therefore, gas containing tubes are almost exclusively operated with rheostat controlled machines.

Moreover, in the hot cathode tube, the current depends upon the temperature of the filament and the voltage can be varied independent of the tube current. For that reason, it is feasible to make use of the very convenient method of varying the secondary voltage with an auto transformer in the primary through which the voltage impressed upon the transformer can be conveniently regulated.

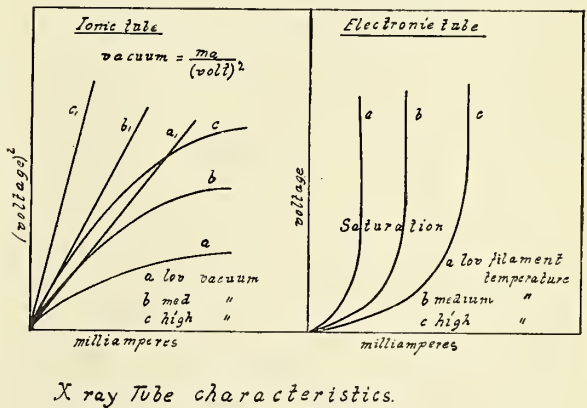


Figure 3.

With this tube, therefore, all ballast resistance could be removed from the primary, but then the tube alone will be depended upon to withhold all the reserve energy of the line except that for which the

filament is adjusted. While this system of control is very convenient and very interesting from the engineering point of view, it offers the serious objection that, should a patient come in contact with one of the wires, or with the tube, the power of the machine, being practically unlimited, would certainly do serious damage before the fuses blow or some part of the wiring burns out and interrupts the current. Other sources of danger from this auto transformer, or constant voltage control, may arise when the filament heating current is interrupted either through a loose contact, breaking of the filament or by accidentally forgetting to turn on the filament current. It appears, therefore, that while this system of control may be very convenient, its recommendation is hardly justified in view of the existing danger. However, with a rheostat through which the current volume can be limited to the desired current for which the tube is adjusted, the auto transformer control is made safe without sacrificing any of its desirable advantages.

ENGINEERING AND COMMERCIAL REQUIREMENTS

From the engineering and commercial standpoint, there are also a number of problems which are not at all easily solved. We have only to consider the difficulties in generating and distributing high tension currents with which the engineers in that special branch are fully acquainted. The normal insulative strength required for a given high voltage may be easily provided; but when surges and oscillations develop in the high tension circuit, it is found that the electrical dimensions and precautions must be doubled or tripled; otherwise, break-down of the system must be expected.

1. *Surges.*—In x-ray machines, surges occur very often because of abnormal conditions developing along the line and in the tube. For instance, when some of the target metal is vaporized and deposited on the inside of the bulb or when dust, which is very strongly attracted, forms a layer on the outside of the bulb, a strong condenser action is set up which gives rise to surges that may become violent enough to break down a poorly constructed transformer or they may puncture the x-ray tube and render it useless. With the very high voltage machines already referred to, which are used for deep therapy, the disturbing effect of surges is very pronounced and special devices, which will be described later, have to be employed to dampen them so as to make them harmless.

2. *Unsuitable Location.*—Very often, due to

lack of space, an x-ray machine is placed in a damp and poorly ventilated room. That this mistake cannot be made with impunity is easily plausible to high tension engineers; nevertheless, physicians very often make the mistake and place the x-ray machine into a room for which they have no other use. Here again, it is the engineer's task to see that such experiments are not repeated, for all previous ones have resulted in failure and disappointment.

Many other disturbances arise from improper care of the apparatus. I just wish to mention as one example that in several cases the color of high tension insulators was not in agreement with the esthetic sense of the medical doctor or the decorator; this prompted them to place a coat of paint on the insulator, and, for some reason or other, they generally select the well-conducting lead or zinc oxide. Quite a number of doctors also prefer to personally install the aerial wires which connect the tube to the machine. They very often use new or wet wood for insulation and are also very eager to embellish their products by gilding, painting or staining the wood with conducting material. The break-down of these defective insulators, however, does not always develop at once, but comes gradually, and the leakage of current resulting therefrom places an increased load on the transformer, and, if it does not actually break down, the leakage creates the false impression that the transformer has broken down.

The possibility of such unexpected burdens must be considered in addition to the exceedingly strenuous use to which an x-ray transformer is put. The time of exposure, especially if made with a large energy, is usually only a fraction of a second. To avoid a drop of potential when the exposure is made, heavier feed wires must be selected than would generally be chosen for the power taken from the line. This sudden drawing of heavy current from a supply line of low resistance naturally places far more strain on the x-ray machine than if the same power were consumed steadily and less abruptly.

3. *Transformer.*—The transformer used for x-ray purposes must naturally have a very high transformation ratio for transforming the commercial line voltages to the desired 120,000 to 150,000 volts. Since the total power consumed per year in an x-ray machine is almost negligible, its efficiency may be considerably lower than in the usual power transformers. There are good x-ray transformers

in use with from 75 to 85 per cent efficiency at full load, but this low efficiency must not be the result of poor construction, but should be entirely due to adequate spacing between the primary and secondary coils, so that there is the best possible protection against break-down between the coils. The coils must be wound with utmost care and the best possible insulation must be provided. To insure good results, the core of the transformer should consist of the best laminated transformer iron and the layers should be separated from each other by a film of good varnish. For the oil and the tank, the usual rules for good engineering must be observed.

4. *Rectifier*.—The installation of the high tension carrying parts and the rectifying segments offers a problem of considerable importance, for any break-down in the insulative strength of the material used will surely result in an interruption of the performance of the machine and very often the trouble is not readily found.

5. *Feeders*.—A moment ago, I referred to the necessity of connecting the *x-ray* machine to feeders which are of larger size than those generally selected for similar power consumption. Very often electrical engineers inquire about the capacity of the machine to be installed and then, according to the information given, they select the size of wire for the feeders. In the writer's experience, it has happened at least a dozen times, that feed wires installed the day before had to be taken out and replaced by heavier ones. But this was not the fault of the engineer, who acted correctly, according to the information given him; but the mistake lies in rating *x-ray* machines in the same terminology and according to the same standards as motors and power transformers. The principal requisite for an *x-ray* machine is that it should deliver a certain high voltage and that this voltage should be maintained uniformly when the *x-ray* switch is closed, i. e., without any initial high voltage kick followed by a drop to a lower voltage.

Another important reason for heavy feeders is to secure a uniform line voltage. Since a comparatively small fluctuation in the supply line causes a considerable change of voltage in the secondary circuit, it can easily be seen that such fluctuations make the operation of the *x-ray* tube unsteady and difficult to control. Moreover, when a hot cathode tube is used and the filament heating transformer is fed from the same line as the *x-ray* machine, the existing fluctuations, or those resulting

from closing the *x-ray* switch, are extremely annoying, and very often in country districts, where heavy loads are on the same transformer, it is impossible to use the hot cathode tube satisfactorily.

6. *Grounding*.—Still another electrical point which, if neglected, will sooner or later lead to accidents and break-down, is the necessity of connecting certain parts of the *x-ray* machine to the ground. As a rule, the motor case and the frame upon which it rests must be grounded. For the purpose of properly balancing the secondary circuit, a certain point in it is maintained at ground potential. It is generally the middle part of the secondary, but it may be any other point which may be arbitrarily chosen or which is determined by the type of tube to be used.

Many break-downs and disturbances are due to improper grounding of the apparatus and this point cannot be too strongly emphasized, because in one out of every two cases of accident the medical doctor or an inexperienced electrician is found to have been negligent. Grounding means the establishing of good electrical low resistance contact between the electrical apparatus and the wet ground. If the usual grounding conductors are tested, it is found that only water pipes containing water are sufficient; gas pipes, steam heating systems, and the metal framework of buildings, etc., are insufficient, for very often they are temporarily disconnected from the ground. When using the neutral of a three-wire system for grounding, it must consist of a somewhat heavier wire than usually employed and must not be fused. As a rule, it is hard to reconcile an electrician to this fact, especially if his training has only been in rules of thumb and not in the actual physics of electricity. But the fusing of a ground wire would be just as irrational as attempting to protect a steam boiler by closing the safety escape valve.

DESCRIPTION OF SOME MODERN TYPES OF APPARATUS

The *x-ray* machines now in use are of the transformer rectifier type, in which the alternating current is commuted and delivered to the tube as a unidirectional pulsating high tension current; a second type of apparatus, generally of smaller capacity, delivers non-rectified, i. e., alternating, high voltage current directly to the tube. A schematic wiring diagram of a transformer-rectifier apparatus is shown in Figure 4. This apparatus is a combination of rheostat and auto transformer control and is therefore suitable for energizing both the gas and the electronic type *x-ray* tubes. The

auto transformer is shown with variable taps, so that the secondary voltage can be varied between the practical limits of 30,000 and 120,000 volts. The rheostat is calibrated in steps so that, with the gas containing tube, uniform increases in voltage and milliamperes of tube current are obtained as we move the rheostat lever from the lower to the higher buttons. The high tension transformer, which may be either of the core or shell type, has a primary winding, as a rule, located beneath the secondary winding coils. In former years the transformers were dry insulated with a wax compound, but the desire to decrease the risk of injury in shipment prompted all manufacturers to insulate and cool the transformers with oil. The two terminals of the secondary of the transformer terminate in two brushes which face a rotating micanite disc on which two segments establish contact with a second set of brushes, and these are connected to the terminals of the tube. The micanite disc, which is rotated by a synchronous motor connected to the same power line as the transformer, is adjusted so that the segments of the disc make contact between the brushes at the moment when the current curve is at its maximum. By making the segments on the disc of the proper length, it is possible to select just the middle portion of the curve and to omit the ascending and descending or "foot" part of the curve, which is of lower voltage and which would therefore produce rays of insufficient penetrative power. Connected to the same supply line is a small step-down transformer, which supplies a heating current of approximately 12 volts to the filament of the electronic tube. This transformer

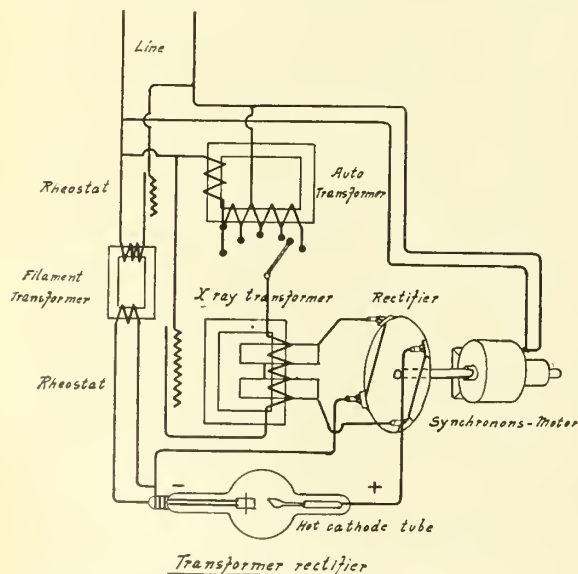


Figure 4. Schematic wiring diagram of a transformer rectifier x-ray apparatus.



Figure 5. X-ray machine with front glass panel removed.

is not required for operating the gas containing tube.

A front view of a machine of this type is shown in Figure 5, which shows the micanite disc with two cross strips making contact between the transformer terminals and the terminals on top of the machine, which are connected to the tube. The switchboard is generally constructed as a separate unit and contains a voltmeter connected across the primary, an indicator showing the polarity of the rectified current, a control in large steps and one giving a finer gradation for the auto transformer, and a rheostat. All these switches, including the fuses, are placed beneath a plate glass panel so that only the insulated switch handles and regulating knobs project. Thus, if the machine is operated in the dark, there is no danger of the doctor coming in contact with any live or current-carrying part of the apparatus. Figure 6 shows the same machine and switchboard from the rear. The transformer tank is located in the lower part of the cabinet and two mica insulated leads carry the alternating current to the two horizontal brushes, which are supported by a pair of insulating arms. The connections to the tube are from the two vertical brushes, also carried on a pair of insulating arms. The synchronous motor is shown in front of the disc.

The mechanism of the rectification can be easily

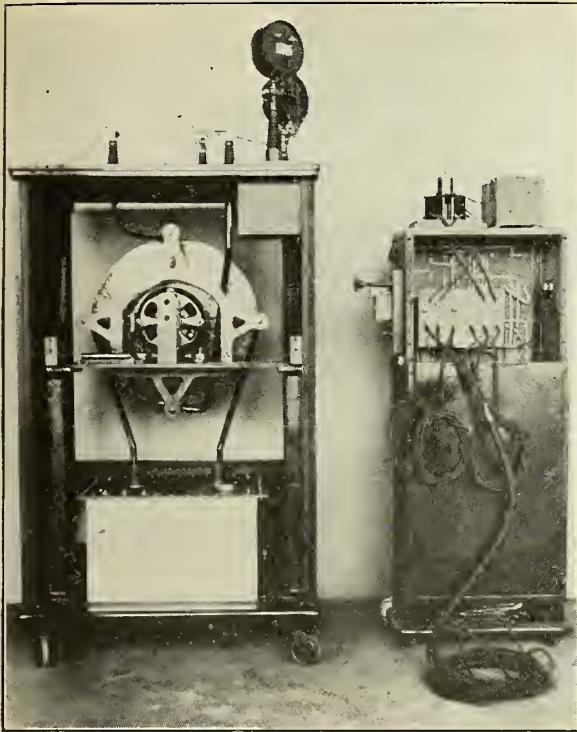


Figure 6. X-ray machine and switchboard from rear; the back cover of the machine is removed; the switchboard is partly open.

traced from the visible connections. If we assume that at this moment, with the disc in the position shown in Figure 7, the positive potential is on the right transformer terminal, then the same potential will appear on the right terminal on top of the machine; the terminal on the left, on top of the machine, will naturally be negative and connected to the cathode of the tube. However, for the next half cycle, when negative potential is developed on the left terminal of the transformer, the disc will have rotated through 90° and the segments will be in a position which will change the polarity so that, as before, the positive polarity impulse is

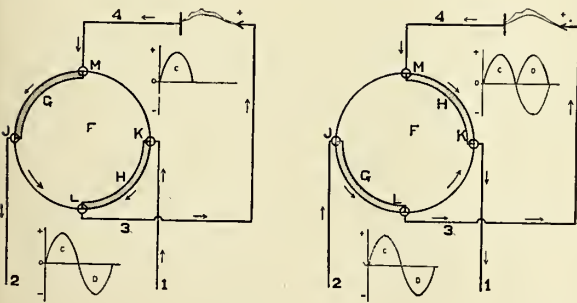


Figure 7. Diagram showing the mechanism of current rectification by the high tension rectifying device.

again delivered at the right terminal on top of the machine and the negative at the left. The function of this rectifying mechanism is therefore that of a periodic synchronous pole changer for the high tension current.

Figure 8 shows the switchboard more in detail. In the lower part is located the auto transformer, which is connected to the dial buttons by means of asbestos-covered wires. Separated with a heavy board of asbestos and behind the auto transformer are the rheostat coils, which are also connected to the buttons of the rheostat dial by means of asbestos-covered wires. On the right upper part of the

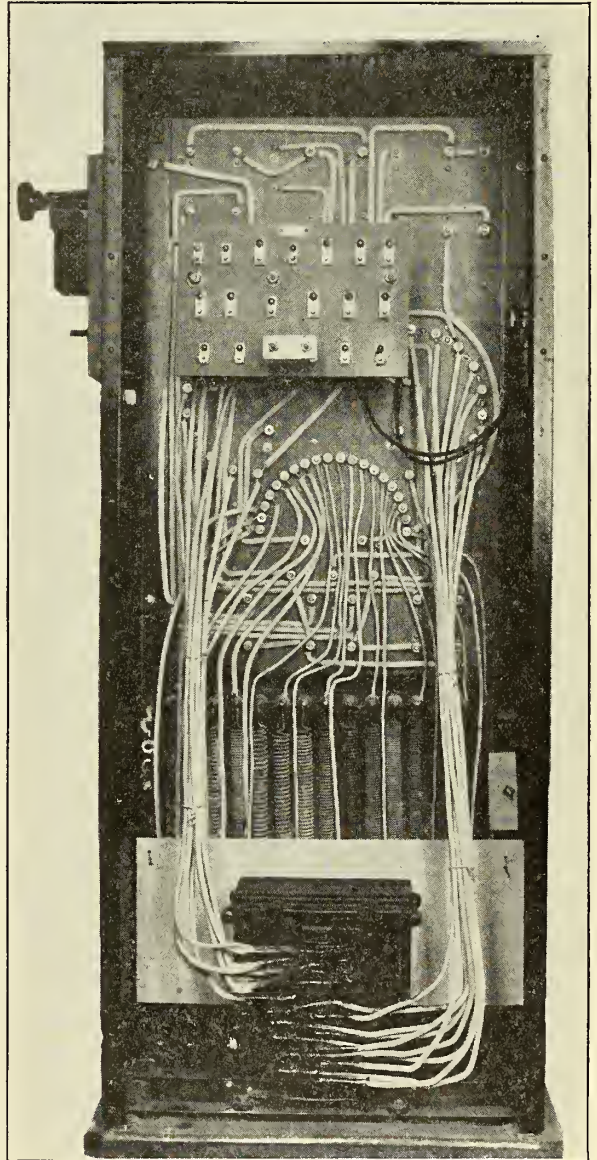


Figure 8. Switchboard seen from rear with back cover removed, showing the rheostat coils and the auto-transformer in front of the coils.

control board there is a regulator for the voltage of the filament heating transformer. It is of the inductance type and the regulation is obtained through varying the magnetic flux by displacing the pole piece, which closes the open electro-magnet. This type of control has the advantage over the resistance control in that it is more constant and does not change because of heating. As can be seen from this figure, after the cabinet is closed, there are no current carrying parts on the outside of the control board and this is an important feature, because very often the machine is operated in the dark and it is exceedingly irritating to an operator to receive small shocks which one can get by coming in contact with low tension switches.

A somewhat simpler type of x-ray machine is shown diagrammatically in Figure 9. This also consists of an auto transformer, a step-up transformer and a filament heating circuit, but it has no current rectifying device. This type of apparatus is adapted only for operating the electronic type tube with a heated cathode. In this apparatus the cathode side is maintained at ground potential and the positive side of the tube is connected to the active terminal of the transformer. This offers the advantage that the winding in which the filament heating current is induced can be placed directly on the auto transformer core. The auto transformer core is magnetically saturated so that any fluctuations which

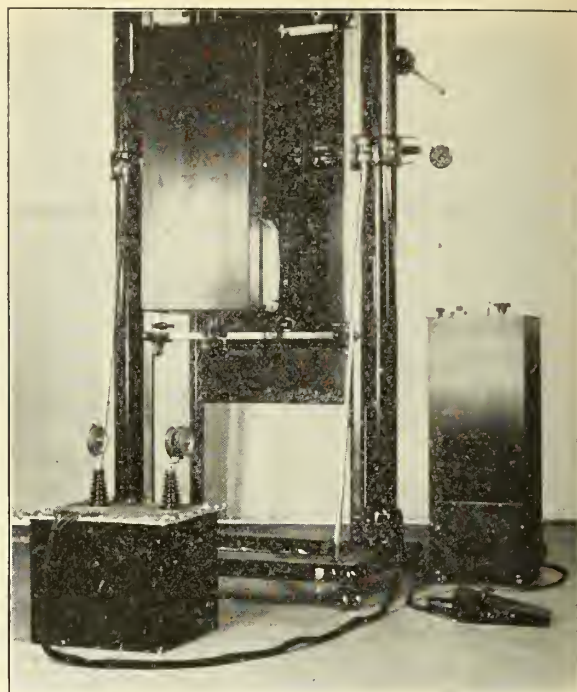


Figure 10. Fluoroscopic unit connected to a vertical fluoroscope.

may exist across the line are either entirely suppressed or very effectively compensated. With this system, an excellent voltage stabilizing feature is obtained. The transformer construction is also simplified in that only one live terminal is present and naturally only one side of the transformer requires insulation for high voltage. This type of apparatus is only used for low capacity units such as are employed for portable work, for fluoroscopy, or for emergency radiographic work.

Figure 10 shows such a unit employed for fluoroscopic purposes. The control is near the operator and enables him to regulate the secondary current and the filament temperature to any desired degree, while performing the fluoroscopic examination, and the transformer current is closed by means of a foot-switch.

Figure 11 shows the switchboard of this unit. There is a regulating knob for the filament current and one for adjusting the secondary voltage. The currents are indicated by the two meters. Contrary to former practice, the control of the tube and its operation is entirely according to meter readings.

The latest addition to the already large family of x-ray machines is represented schematically in Figure 12, which shows the electrical construction of the modern "deep therapy machine." This con-

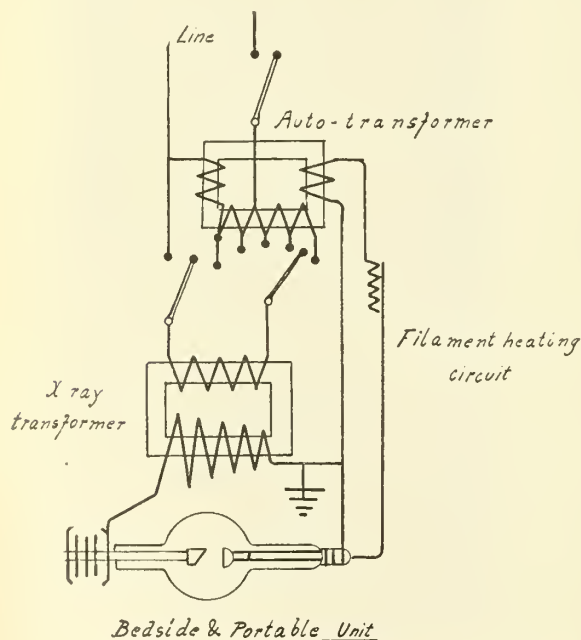


Figure 9. Schematic wiring diagram of bedside and portable type of x-ray apparatus.

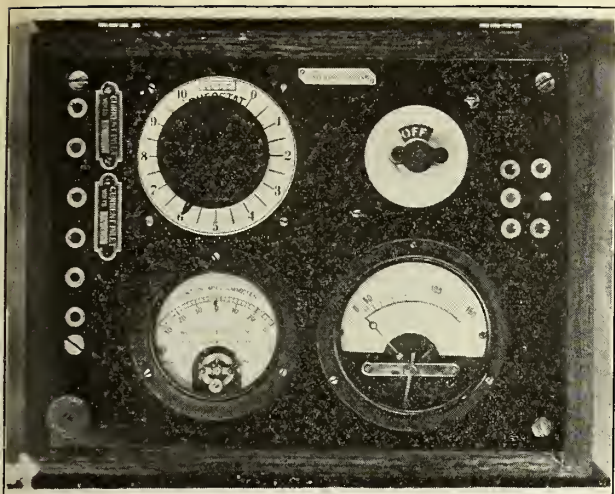


Figure 11. Switch control board of a portable x-ray unit.

sists of two separate oil immersed transformers, two rectifying discs driven by one synchronous motor, a regulating rheostat, a damping device, which is represented conventionally as a resistance grounded in the middle, and then, for the heating of the filament of the electronic tube, a step-down transformer with a current regulator. The machine is practically made up of two units of the type previously described, which are connected with each other and coact in such a way that each transformer develops a difference of potential opposite to that of the other, and when applied to the two ends of the tube their voltages are added to a total maximum potential difference of 300,000 volts. This is made possible by maintaining the secondary at ground potential at a point between the two transformers. The two voltages are then developed on one leg of each secondary while the other two legs are connected with each other and with the ground. It is thereby possible to place the motor and the platform upon which it rests between the two transformers and then mount rectifying discs at the two ends of the motor shaft. The oscillation damping device previously referred to consists of resistances, in magnitude of the order of the resistance of the tube, and these are so placed in the high voltage circuit that the loads of the tube and the resistances are equally distributed on both sides of the secondaries of the two transformers. This equal distribution of the loads at the secondaries lessens the electrical strain on the windings and at the same time, if properly balanced, suppresses all oscillations and surges which would form in the absence of these damping resistances.

When we first undertook the construction of the deep therapy machine it was found that oscillations and surges occurred much more frequently and violently than in the machines hitherto used, probably because of the higher transformer ratio and the much higher voltage current to be rectified by mechanical rectifiers. These oscillations and surges become evident through the formation of extensive corona and ozone along the wires, the flickering of the tube and the tendency of the current to discharge along the tube arm, from which puncturing of the glass wall is likely to result. There may also be sparking to the tube shield usually employed to protect the patient and the operator against stray radiations. When charged with such high voltage current, these parts attract dust particles electrostatically and this deposit greatly facilitates discharges along the glass walls to the grounded tube-stand. For this reason, all possibility of operating the machine at the desired high voltage depended almost entirely on the discovery of an effective means for preventing the formation of these disturbing oscillations. From an analysis of the electrical conditions presented in this case, there might have been several solutions to the problem, but we found that by connecting glass tubes filled with water or high resistance silundum rods into the secondary circuits, the oscillations were effectively suppressed. It was then merely a question of properly balancing the circuits and placing the resistances so that the best protection for the transformer secondaries would be obtained.

The importance of such a device may be illustrated by the fact that the new deep therapy x-ray tube manufactured by the General Electric Co. is rated for a maximum of 200,000 volts, which is

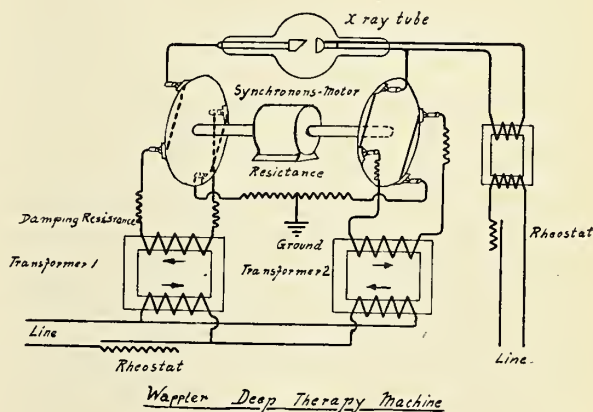


Figure 12. Schematic wiring diagram of a high-voltage deep therapy x-ray apparatus.

equal to a spark jumping 14 inches between points in air. When such a tube is run on a machine in which the oscillations are not eliminated, there is distinct distress shown as soon as this voltage is exceeded. However, with a properly balanced machine, we are able to run the same tube continuously with a potential of from 260,000 to 280,000 volts, which voltage will jump a gap of 18 inches between points in air. Machines built according to this principle have now been in operation in a number of clinics for several months and so far there has been no disturbance nor accident either in the machine or in the tube.

Figure 13 shows the interior of the deep therapy machine. In the center there is a synchronous motor mounted on an iron platform and on this platform there are two metal frames, each of which carries 4 high tension insulators projecting in opposite directions. On each end of the motor shaft there is a rectifying disc. These are cut out to the form of a cross, for we found that the resistance offered by narrow edges in cutting through the air is over 50 per cent less than the surface friction produced on a round disc of the same diameter. By shaping the discs in this manner we are able to use, for the two discs, a motor of the size employed for smaller machines with a single circular disc without any risk of the motor dropping out of synchronism. We also found in general that the mechanical strain on the motor and the resistance of the peripheral air friction of this rectifier are very much less, and therefore the entire double rectifying mechanism requires considerably less power than when circular rectifying discs are used. Still another advantage was found in the cross-shaped disc, namely, that the undesirable air blast which is set up by a circular disc and which has a tendency to blow oscillating arcs when the segments make contact with the brushes is very much decreased.

About midway between the rectifying mechanism and the iron frame are two large stationary mica discs which are very effective in stopping the creeping effect of the high tension current along the insulators, which becomes very disturbing when dust or moisture has deposited on the insulators. The resistances used for damping the oscillations can be seen in the two front conductors from the transformer to the rectifier and a second set is located in the transverse channel shown directly beneath the platform. The ground is made in the middle of these resistances. The two high tension

transformer tanks are located in the lower part of the cabinet and the transformer for the filament circuit is in the center of the rear upper part of the cabinet.

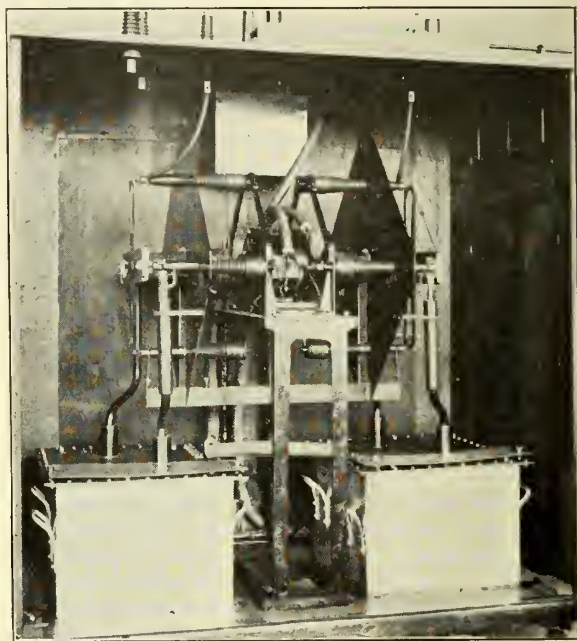


Figure 13. Deep therapy x-ray machine, front part of cabinet removed.

It may easily be seen from this figure that the grounded part of the apparatus and the low tension current carrying parts are all located in the center and that the two high tension carrying parts and the rectifiers are on the outside, screened off from the grounded motor and metal frame by two large mica discs. This "deep therapy machine" is therefore novel in that it consists of practically two machines connected in series. The difficulties in generating and rectifying high tension current up to 120,000 volts are too well known to require special mention and the creation of voltages over twice as great would therefore seem almost hopeless with the old system. In the new type deep therapy machine, the problem of generating this excessively high voltage of 300,000 volts is therefore simplified by using two transformers of a well-tried-out type, and connecting them in series in the above described manner.

So far as actual results with this method of treatment are concerned, it might be interesting to cite a few points which were reported at the last meeting of the American Roentgen Ray Society, held last September, 1921, in Washington. One doctor,

who had been rather skeptical about this new method, decided to try it out and selected two patients who were in an absolutely hopeless condition, both suffering from cancer in the advanced or third stage. At the risk of causing skin burns, he administered to each of the patients, in one day, what is considered a cancer dose and requested them to return one week later. While very much surprised at their return after that time, his surprise was still greater when he found that one patient, whose cancer was located in the alimentary canal, was able to eat without trouble, while formerly he had great difficulty in swallowing milk, and the second patient, whose cancer was of the pancreas, had gained considerably in weight and showed distinct signs of improvement. Two months later they were pronounced clinically free from symptoms of the original disease and from all external appearances they were cured. Similar cases were reported by many others, and it might be stated that the spirit of that meeting seemed to indicate that this method of attacking malignant cases, if used in the proper way, is the only effective weapon against cancer.

METHODS OF MEASUREMENT

Undoubtedly, a short survey of the methods of measuring x -rays used at the present time would be of some interest to engineers. These may be divided into two classes: the direct method and the indirect method. The former is based on the observation of changes produced by the rays in certain substances, such as pastilles which consist of small paper discs covered with bario-platino-cyanide and which turn dark in proportion to the quantity of x -rays that fall upon them. Another visible chemical change is produced in mercury iodide pastilles or is recorded on a photographic paper which must be developed under absolutely regulated conditions. These direct methods of measurement give only a very rough approximation of the quantity of rays and are all based on the unverified hypothesis that the action of the rays on these chemical materials is the same as on the living tissue. However, this has never been corroborated, but there is even evidence to the contrary as to the correctness of this assumption. These direct measurements were relied upon in the practical roentgen ray laboratory until the time came when the whole roentgen art advanced to a more scientific stage, when actual measurements upon the x -ray generating currents were made. It is now about three or four years since roentgenologists became accustomed to reading the milliamperemeter and using the parallel

spark gap as a voltage indicator. For the lower voltages used in radiographic work, the point-point gap gives satisfactory readings, but for measuring the higher voltages used in therapy the sphere gap, as standardized by the American Institute of Electrical Engineers, is more reliable.

The instruments used in the scientific laboratory, such as the selenium cell or an ionization chamber for measuring the intensity of x -ray radiations, have been used extensively for research, and in Europe by roentgenologists, and quite a number of interesting discoveries have been worked out from the measurements made. But, if these instruments are not used under carefully controlled physical conditions, the errors may be very great. The x -ray therapists, however, are making very rapid progress in using such instruments, so that these possible sources of error are gradually being eliminated or minimized.

An exact measurement of the quality and quantity of the rays is certainly very important in this work, especially if we consider the fact that for therapy it is necessary to pass the radiation from the tube through an appropriate filter so as to withhold all rays of lower penetrative power than the principal radiations. This is absolutely necessary, for otherwise, the more active rays of low penetrative power would be stopped in the surface layers of the tissue and would cause skin burns before any effect could be exerted in the deep by the more penetrating rays. It follows that if the less penetrating rays could be eliminated, it would be possible to considerably increase the dose upon the deep-seated part without overdosing the skin layer. Therefore, although filters decrease the intensity of the total radiation quite markedly, they cannot be omitted.

Before x -ray treatments can be given safely, it is necessary to:

1. Determine the thickness of filter required to eliminate from the radiation all rays of lower penetrative power.
2. Measure the intensity of the radiation which passes through the filter.

At the present time it is known that approximately 0.75 mm. of copper or zinc is required to make the rays sufficiently homogeneous for practical purposes, but the exact dosage or the biological effect of the various voltages applied to the tube must be determined for practically every machine. For a given thickness of filter, therefore, a conversion factor must be determined in order to

be able to calculate the dosage from the energy consumed in the tube. This means that a conversion factor expressing the relation between the radiant energy produced by the measured electrical energy passing through the tube and the radiation which emerges through the filter must be determined by actual test. The electrical measurements of the current, and the voltage, i. e., the milliamperere meter reading and the spark gap, are therefore recorded, so that the operator is able to reproduce a given tube setting or duplicate the work, but these cannot be depended upon as absolute indices for quantity measurements.

PROSPECTS

A question probably exists in the mind of every one interested in this subject regarding the prospects and expectations for the future of the roentgen therapeutic methods for malignant diseases or for the radiographic method of diagnosing diseases in general. The past war has undoubtedly established the fact that for the diagnosis of diseases, the use of *x*-rays constitutes one of the so-called positive means of diagnosis. While before the war only a few so-called *x*-ray specialists and some of the more modern internists had recognized and believed in the value of *x*-ray diagnosis, many more men while in the service became acquainted with the great advantages of the *x*-rays in diagnosis. A direct evidence of this is the fact that since the war the use of *x*-rays has been increased enormously and is still increasing, especially since clinical experience in this field has also been considerably augmented.

As to the method of treating malignant diseases, it seems that surgery is gradually being displaced, as it does not always bring about a permanent relief from the affliction, for, even if the malignant part is successfully removed, recurrence of the disease sets in almost immediately and the disease then progresses at a far more rapid rate than before the operation. For a long time *x*-ray therapy was employed as a method of after-treatment after surgical procedure, but clinicians are more and more coming to the conclusion that without surgical interference, i. e., with *x*-ray therapy alone, it is easier to cure the disease than after the growths have been removed by surgery. The general trend seems to be more and more toward the use of deeply penetrating *x*-rays for the treatment of malignant diseases and the results obtained seem to indicate that, as the clinical technic advances, *x*-ray treatment will be used more and more extensively.

As to the method of procedure in the treatment of malignant diseases with *x*-ray, there are two theories which are now being tried out. One is to deliver *x*-ray in small doses to the diseased part and in that way inhibit the growth of the disease and stimulate the defensive function of the system. This method is perhaps less difficult to apply and to control, and is less burdensome to the patient. The second theory is to give the patient a full cancer dose in one or two sittings, which may last from 5 to 10 hours, or, in other words, deliver to the cancer a so-called knockout dose. This method seems to gain in reputation and seems to produce very striking results, especially in the more advanced cases, which would otherwise be hopeless. There seems to be great enthusiasm over those cases which are treated with knockout doses, and while it is to be hoped that there may be no mistake about the beneficial results obtained by this method, yet the enthusiasm may be somewhat exaggerated because of the very unexpected results. From the general tone that prevails at roentgen ray meetings, however, the impression is gained that there are enough men in the field with sufficiently conservative judgment to prevent the error of overrating these methods.

Much work is still in store not only for the clinical roentgenologist, but also for the physicist; for the latter, the most serious problem is to study the nature and properties of scattered radiations, and for both, to compare and test the relation between physically obtained data and physiological effects. For the roentgenologist, there remains the problem of working out methods for the treatment of the patient, either before or after the *x*-ray treatment, so that the rays can be applied in sufficient quantity to actually destroy and inhibit the disease. A review of the literature on this subject clearly shows that failures in this method are generally due to inefficient and improper application of the rays and the most serious problem therefore is to outline and determine standard methods or the best conditions under which an effective *x*-ray dose can be administered to a deep-seated lesion without seriously injuring the patient.

In conclusion, I wish to express my desire that in the time allotted me I have been able to bring before you some of the most important problems which confront the *x*-ray engineer. Although the *x*-ray art has made remarkable progress during the short time of its existence, it is my opinion that it will be furthered very materially by formulating

and working out standards in technic and apparatus, so that the methods of applying the rays will be uniform, the results of various investigators can be compared and improved and the therapeutic results can be duplicated at any time and in any place, and may thus become beneficial to mankind.

ARTIFICIAL PNEUMOTHORAX IN PULMONARY TUBERCULOSIS*

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Artificial pneumothorax in the treatment of pulmonary tuberculosis has been used extensively in this country only since 1912, although it was recommended a century ago. James Carson¹ of Liverpool in 1821 urged its use on theoretical grounds shortly after the elasticity of the lung was recognized. In 1832 James Houghton² and in 1837 Stokes³ reported cases showing improvement after spontaneous pneumothorax had occurred. Several other citations are found in the literature of the nineteenth century where the chest wall was opened to control hemorrhage.

It was Forlanini³ of Pavia, Italy, in 1894, who first induced a pneumothorax for therapeutic purposes in chronic phthisis. Quite independently of Forlanini, John B. Murphy⁴ of Chicago in 1898 performed the same operation, using a trocar and cannula, and advocated its use for incipient cases, claiming it was the appendix question in a new form. For some time little or no attention was paid this form of treatment until Brauer⁵ and others in Germany took it up and reported their first cases in 1905 and 1906. In 1906, Forlanini³ reported 25 cases which he had treated since his previous publication. In 1912, Robinson and Floyd⁶ awakened American interest in pneumothorax therapy.

Since then, induced pneumothorax has been widely used and has assumed its rightful place among the therapeutic measures known to have definite value in the treatment of pulmonary tuberculosis.

The primary purpose of artificial pneumothorax is to collapse the lung as completely as is possible, thereby putting it to rest, thus satisfying one of the cardinal requisites in the treatment of tuberculosis in nearly all parts of the body. When one stops to reflect that the lung is constantly in motion, ex-

piration and inspiration occurring about 20,000 times a day, the immense importance and value in putting the lung at rest is readily understood and appreciated. Benefits of importance other than rest ensue upon lung compression. As the lung is collapsed, it becomes emptied of its contents. The bronchioles, alveoli and cavities, if such exist, are rid of pus, cellular debris and inflammatory exudate; in a sense, drainage is effected. By the reduction in volume of the lung, atelectasis is produced which favors fibrous tissue formation,⁷ and therefore healing. Post-mortem evidence leads us to believe that no fresh tubercles develop in the collapsed lung.^{3, 8}

Another factor of interest and importance to the clinician and patient alike, is the rapid reduction of toxic symptoms. Fever subsides, night sweats cease, malaise disappears, wasting is checked; the patient begins to feel better, his expression is brighter, he takes a new lease on life. This barring or damming up of the toxins is accomplished presumably by the lymph stasis, which results from the lung immobilization. The lymph stasis reduces absorption to a minimum and breaks the vicious circle of autotoxemia-focal reaction-autotoxemia, which is dragging the patient mercilessly down. Although there is a definite checking of the lymph circulation, the blood flow seems to be but slightly impaired.⁹ At times we are unable to obtain a complete collapse because of adhesions, but frequently in these partial collapse cases, the compression is sufficient to reduce the toxemia to a point where the natural resistance is given an opportunity to pick up, thereby starting the patient on the up grade.

To no small degree, the success of pneumothorax treatment lies in the selection of cases for its application. In severe ungovernable hemorrhage, when the origin of the hemorrhage can be ascertained, pneumothorax is indicated; large amounts of gas (1000-2000 c.c.) are used in these cases to collapse the lung immediately in order to check the bleeding.

In early and moderately advanced disease, with persistent recurrence of small hemorrhages, pneumothorax is most efficacious.

The classical case for artificial pneumothorax is the one of advanced unilateral disease. Advanced disease, strictly limited to one side, is rather unusual, as we learned after the advent of the x-ray. It occurs in probably not more than 5 per cent of advanced cases. Evidence of involvement in the supposedly sound lung has been stressed as a con-

*Read before the Medical Forum and Ramsey County Medical Society, December, 1921.

traindication to collapsing the extensively involved one by many workers, particularly in Europe, but experience in recent years has shown that this contraindication is far from absolute. Kendall,¹⁰ in a series of 131 cases, had 71 per cent with bilateral involvement. Simon¹¹ and others have shown that in bilateral cases the collapsed lung frequently shows marked improvement. We have noticed this in four of our cases. Therefore, bilateral involvement does not necessarily contraindicate pneumothorax, but it probably renders a less favorable prognosis.

There have been advocates for the induction of pneumothorax in the early stages, but it seems to us that these patients should be given a trial under a strict sanatorium regime and if they improve let them so continue.

In event of the disease progressing, despite careful sanatorium treatment, we feel that compression should be instituted even though the lesion be not extensive. This is a point not sufficiently emphasized in the literature, though several workers have taken the stand. Unfortunately, many are inclined to wait too long and to use pneumothorax as a last chance. Beggs¹² very aptly has said, "In tuberculosis, to wait for a last chance is to wait for a lost chance," and that "there are as many consumptives who die as a result of neglected opportunities as from any other cause." Perhaps this is an exaggeration, but the point is well taken. Too often cases are permitted to go until extreme emaciation has occurred and all resistance gone before compression is considered. It is as unfair to judge the efficacy of pneumothorax therapy in this class of cases, where results are bound to be unfavorable, as to judge surgery in its attempt to deal with malignancies which have metastasized. Balboni¹³ goes straight to the crux of the matter in asserting that, "No case, so long as it is progressive in character, can be regarded as too early for pneumothorax treatment."

Certain conditions besides active bilateral phthisis may contraindicate the induction of pneumothorax—emphysema and asthma, heart lesions, nephritis and intestinal tuberculosis. Several authorities^{3, 10, 14} cite diabetes as a contraindication to the induction of pneumothorax. We have had two such cases in which no untoward events occurred which could be ascribed to the diabetes; both of them were under good control, being sugar-free.

The technique of inducing pneumothorax is quite simple, but not entirely without danger. Gas is to

be introduced into the pleural cavity and that cavity only. Several types of technique have been described, but we employ that generally used in doing a thoracentesis. The skin is iodinated; 1 per cent novocaine used subcutaneously and down to the pleura; the skin incised with a sharp-pointed bistoury and the pneumothorax needle inserted.

The apparatus used is not complicated. The Robinson outfit consists primarily of two large bottles of 2000 c.c. capacity each and a U-shaped tube graduated in centimeters, called the manometer, which is the most important part of the equipment, as it tells us whether or not the needle is in the pleural cavity. The two bottles are connected with each other by rubber tubing, and one bottle connects with the manometer by a Y-piece, the third limb of the Y carrying the needle. To prepare the apparatus for use, bottle "A" is filled with water, a sterile cotton filter is attached and, by creating syphonage, bottle "B" fills with the water which has been displaced by filtered air in "A." Nitrogen was used for some years, presumably because it would be absorbed more slowly than oxygen or air. It has been demonstrated quite conclusively, however, that there is very little difference in the rate of absorption by the pleura between nitrogen and air.¹⁵ Air, being omnipresent and inexpensive, is quite universally used at present. A specially constructed needle is used; the one devised by Floyd we have found to be very satisfactory.

The first injection of gas should be done with extreme care, as it is at this time that accidents are prone to occur. The site where the needle is first introduced is usually in the sixth, seventh or eighth interspace between the axillary and posterior axillary line, as here the excursion of the lung is the greatest and hence adhesions are least likely to be present.

Adhesions are the greatest bar to a successful collapse, but we are learning to deal with them satisfactorily. In favorable cases, where the adhesions are not massive, it is possible to separate them with the actual cautery through a thoracoscope. Jacobs,¹⁶ who first suggested this procedure in 1913, has recently reported 40 cases in which it has been done with good results in 75 per cent. He reports no serious hemorrhage in any of these cases. Although numerous methods have been propounded to detect the presence of adhesions, the most reliable way is to introduce the needle and note the manometric response.

The patient should be in the recumbent position, with the hand of the side to be punctured placed over his head, to widen the intercostal spaces. It is well to give a sixth of a grain of morphine just before the first inflation, to quiet apprehensiveness. The patient having been prepared as outlined above, the needle is inserted in the small skin incision and pushed slowly but firmly down at right angles to the chest wall. On reaching the endothoracic fascia, one encounters a firm resistance. This is repeated on passing through the pleura. Once in the free pleural space, the manometer gives an unmistakable reading of from -3 to -6 or -7 , the column of water fluctuating with inspiration and expiration. The gas can now safely be introduced, 300 c.c. being the average first fill. This amount of gas will produce no appreciable effect upon the intrapleural pressure, as registered by the manometer, if there are no pleural adhesions present. If a small pocket has been entered, the pressure will rise markedly. If there are dense adhesions, with no pleural space, the manometer gives little or no response, and, if this be the case, no gas should be introduced. If the needle goes through into the parenchyma of the lung, no change is recorded, and if into a bronchus or bronchiole, usually slight oscillations equal on the two sides are noted.

If fortune has been with the operator and he finds a free pleural space, gas should be introduced every third or fourth day, 400 or 500 c.c. at a time till the lung is collapsed. Shortle¹⁷ has emphasized the importance of giving small amounts of gas and not waiting too long between refills. He says, "With small frequently repeated doses, the lung is slowly collapsed, giving time for the other lung to develop its compensating emphysema, and then when collapse is effected it is maintained instead of the lung being allowed to partially re-expand and thus break up what granulations have formed." The degree of collapse is determined most accurately by the x-ray. The intrapleural pressure rises with each refill, care being used to obtain the optimum pressure necessary to collapse the lung rather than the maximum pressure which the individual can tolerate. If we produce too great a pressure, the mediastinum is pushed over too far, effecting a partial compression of the functioning lung, inducing dyspnea, cardiac embarrassment and perhaps pulmonary edema. Parfitt¹⁸ calls attention to the necessity of more closely watching the manometer and of more carefully interpreting the readings. He stresses the fact that the mediastinum is a mobile structure

and harm to the patient will result if this fact is neglected and high pressures used promiscuously. At first, the pleural surface absorbs the air rather rapidly, necessitating frequent refills, but as time goes on this power of absorption diminishes so that at the end of six months or so a refill every two or three weeks is sufficient to maintain a good collapse.

If we have had the classical case suitable to pneumothorax treatment, i.e., the unilateral progressive type, and have found a pleural cavity comparatively free from adhesions, the results from the compression are striking. The fever subsides not to return, barring complications. As the lung is being collapsed, the amount of sputum naturally increases, due to the squeezing-out process, but with a complete collapse attained, the expectoration drops to a very small amount and usually ceases. Night sweats disappear with the re-establishment of normal temperature, affording the patient untold relief; his appetite improves and he begins to feel stronger.

The physical signs obtained as the lung is gradually collapsed are such as would be expected. With the repeated introduction of air, the mobility of the side is greatly diminished, the percussion note becomes hyperresonant and the breath sounds become fainter and fainter, finally absent, the adventitious sounds disappearing with the breath sounds. Occasionally, we hear exquisite amphoric breathing or distant metallic breath sounds where the lung is completely collapsed. These are due to sounds from the bronchi.

Unfortunately, all pneumothorax cases do not follow the ideal path as outlined above. There are dangers attendant upon the operation itself as well as complications which may follow it. Pleural shock, gas embolism, perforation and rupture of the lung and subcutaneous emphysema, constitute the chief dangers, while pleural effusion is the main complication.

Pleural shock is infrequent and varies in degree from an increase in pulse rate, accompanied by pallor and dyspnea, passing off in a few minutes, to an alarming state approaching death. Its etiology is obscure and the best preventive is the thorough injection of novocaine.

Capps and Lewis¹⁹ work with dogs tends to throw some light on the question of pleural shock. They found that irritation of pleuræ of healthy dogs produced little or no effect upon blood-pressure. In dogs with artificially induced pleurisy, irritation of the visceral pleura by means of a sharp

needle or chemicals in some instances caused no disturbance, in others it induced a marked fall in blood-pressure. They were able to distinguish two types of depressor reaction:

I. Cardio-inhibitory. These exhibited slowing of the heart action, violent excursion of the diaphragm in the tracings and slow respiration. This type of reaction was checked by vagus section or atropine.

II. Vasomotor. Here was noted a rapid thready pulse and a steady fall in blood-pressure that not infrequently terminated fatally. Adrenalin intravenously combated this type effectually in several instances. It is quite probable that the syndrome known as "pleural shock" is closely related to "depressor reactions" observed in dogs, although it must be borne in mind that it is probably injury to the parietal pleura which produces the symptoms in man, whereas the visceral pleura was irritated in the dogs. We have not met with pleural shock in over 500 punctures.

Gas embolism occurs when proper attention is not paid to the manometer and the air turned on when the needle is in the lumen of a blood vessel instead of in the pleural cavity. At times, gas embolism is difficult to differentiate from pleural shock so closely one may simulate the other. Collapse, respiratory irregularity, thready pulse, dizziness, pupillary inequality, and hemiplegia are the symptoms usually noted. Gas bubbles in the retinal vessels are claimed to have been seen, but this is uncommon. At times, rarely, death occurs with no warning. Since Saugman introduced the manometer in 1907, gas embolism fortunately has been practically obviated and relegated to the early period of collapse therapy.

Perforation of the lung with subsequent spontaneous pneumothorax is not common with the specially constructed pneumothorax needle. Besides the shock usually attendant upon the occurrence of spontaneous pneumothorax there is the added danger of a pyothorax. Rupture of the lung by the separation of an adhesion at its visceral attachment or by the blowing out of a subpleural cavity is a grave complication. This adds a spontaneous pneumothorax to the induced one with its attendant shock and danger of infection. We have had two such cases, one dying within 48 hours, the other within a month of the accident.

Subcutaneous emphysema is not particularly dangerous, but may be painful if extensive. It

usually occurs if the patient coughs severely after the gas has been given and the needle withdrawn. Rarely the gas works its way under the costal pleura and up the trachea to the neck, where crepitations can be felt. Dysphagia may result if the emphysema be severe enough. The outcome is always favorable. Kessel and Taschman²⁰ consider subcutaneous emphysema a contraindication to re-inflations. Our experience does not substantiate this view.

Pleural effusion (serous) occurs in approximately 50 per cent of all pneumothorax cases, according to most workers. In our very limited experience of 21 pneumothorax cases, effusion has developed in eighteen, some slight and appreciated only by the fluoroscope, others easily discovered by physical examination. Peters²¹ also has found fluid in 90-100 per cent of his cases. With the exception of a small number of cases with pyogenic infections, due to faulty technique, the effusions are sterile to ordinary culture and show tubercle bacilli microscopically or in guinea pigs. Various theories of explanations have been advanced to explain this frequency of effusions. Klemperer's²² explanation is that "disease processes which reach the surface of the lung and the visceral pleura cause adhesions in patients with normally superimposed pleural sheets, but in pneumothorax with separated pleural sheets exudative inflammations are the result." Bullock and Twitchell,²³ on the other hand, consider the effusion a response to a foreign body irritation, the gas acting as a foreign body. Paterson²⁴ considers them all of inflammatory origin.

The mode of onset of these pleuritis is not always the same. In some, the fluid may form slowly with no symptoms. These patients usually note the "splash" themselves before the physician detects it. In others, the onset may be sudden and acute, with pain, high fever and general illness, followed by the more rapid appearance of fluid.

As a rule, it is better not to withdraw the fluid unless it causes cardiac embarrassment, because it keeps the lung collapsed and tends to absorb spontaneously. Then, too, an immunizing effect may result from the effusion. If fluid is withdrawn, gas should be introduced simultaneously or directly after to maintain compression.

Unfavorable effects may follow an effusion. If there is fever with general symptoms, the setback may be made up with difficulty. An effusion also tends to a thickening of the visceral pleura, which,

of course, would hinder the ultimate expansion of the collapsed lung. A true pleuritis deformans may follow an effusion. This results from the obliteration of the pneumothorax cavity, due to the pressure of the contracting fibrous tissue in the organized pleural layers. There is a very gradual contraction of the side, and drawing in of the mediastinum which the highest gas pressure cannot prevent. Not infrequently the collapsed lung is partially re-expanded with a subsequent reappearance of symptoms.

Occasionally, the serous fluid becomes purulent, containing many tubercle bacilli, but no pyogenic organisms. Some of these pyothoraces clear up under repeated aspiration with gas replacement; others persist for some time with no apparent harm to the patient, while still another group go downhill slowly, despite any and all treatment. Kalb²⁵ has recently reported success in these tuberculous empyemata by using the Murphy treatment of aspiration and replacement with a two per cent solution of formaldehyde in glycerine, using about half as much of this solution as pus aspirated. He cleared up seven of ten cases by this method. Rib resection and drainage has been notoriously unsuccessful with uncomplicated tuberculous empyemata.

The length of treatment cannot be determined with accuracy because we have no means at our disposal to tell when the disease is healed. Most authors agree that the collapse should be maintained for at least two years, and, even at the end of that time, the expanding lung should be followed most carefully so that reinflation can be instituted in case fever, cough, etc., make their reappearance. Shortle¹⁷ makes an excellent point concerning the re-expansion of the compressed lung. Instead of abruptly discontinuing refills, he gives smaller and smaller inflations, which permits the lung to come out more slowly, which is obviously a very wise procedure. Some patients require a pneumothorax for an indefinite period, whereas cured cases are on record following only one year's collapse. In doubtful cases, it is better to continue treatment than to stop it.

The general care of collapse cases must not be neglected. From some over-enthusiastic articles, one is apt to deduce that with the lung collapsed the problem is solved. This is far from the truth. These patients still need careful watching and a well-supervised regime mapped out for them. We generally keep them in bed for at least one month

after their temperature has become normal, then gradually permit them to go to the table for meals and finally start them on exercise. In other words, they undergo the usual sanatorium regime, and it is exceedingly important that this be done.

In speaking of the general results of pneumothorax treatment, Riviere,³ in 1917, said, "that the time for a statistical summing up of the results of pneumothorax treatment has hardly yet arrived. Nevertheless, though the ultimate percentage of complete cures is hardly yet at hand, the enormous volume of clinical improvement clearly emerges from the available figures, and even if the results were not permanent, yet the prolongation of life, increased comfort and well being, and return of power to work, and this, for the most part among cases of advanced disease, entitles the operation of pneumothorax to a very high place among successful therapeutic measures." Sewall²⁶ recently has explored the fact that the literature is nearly silent on the final results of pneumothorax treatment. Saugman,²⁷ however, has given results which seem final enough, covering over 400 cases which had been discharged from 1906 to 1916. His report gives their condition in January, 1919, which shows that 32 per cent of those in whom collapse was attained were capable of doing light or ordinary work. Remembering that his results cover a period of 10 years and that his patients were severely attacked third-stage patients, whose prognosis was otherwise hopeless, one must admit that in pneumothorax therapy, we have an efficient well-proved method of treatment.

Our experience during the past two and a half years, covering 21 cases, substantiates previous reports on the efficacy of collapse therapy. We have had indifferent results, to be sure, but we have also had brilliant success. It is too soon to give anywhere near final results on our series, but we are convinced by our short experience with the procedure that it has definitely positive value in the treatment of pulmonary tuberculosis, that its possibilities should be kept more in mind by the profession at large and that patients should be given the opportunity that pneumothorax offers them, not as a last chance, but before their resistance is beyond recall.

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REPAIR OF PERIPHERAL NERVES*

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With the experience of the war as a background, we now harbor no doubt as to the process of regeneration in peripheral nerves. Given a freshly sutured nerve, we know, as observed by Ranson,² that within the first twenty-four hours there is formed a plastic exudate between the nerve ends. In the distal stump, adjacent to this exudate, is a narrow area in which evidences of an early abortive reneeration are seen, characterized by the formation of many small branches from the axis cylinders, having club-shaped end bulbs. These form a distinct network. Distal to this, degeneration of both medullated and nonmedullated fibers begins at once and progresses rapidly. By the eighth day the neurilemma cells have increased greatly in size and have formed protoplasmic bands which largely fill the space formerly occupied by the myelin and axis cylinders. In the proximal stump, a narrow area adjacent to the exudate shows an abortive regeneration similar to that in the distal stump. For a short distance proximal to this is a form of reaction characterized by swelling of the nerve fibers and the formation of a neurofibrillar reticulum which fills up the space within the neurilemma. The axis cylinders undergo retrograde degeneration up to 5 to 10 mm. above the suture line. The new fibers are seen on the eighth day as side branches coming off above the zone of degeneration, multiplying rapidly and growing downward as parallel bundles within the neurilemma, or spirally to form distinct skeins. When the scar is reached, these new fibers, with their terminal bulbs, spread in all directions, forming a dense network, the general trend of which is toward the distal stump. By the 14th day, a large number of new fibers have bridged the scar and started to grow into the distal stump, where they are guided by the protoplasmic bands in which they travel. Kirk and Lewis² observed similar phenomena after tubulizing with fascia a gap formed by removal of a 10 mm. segment of the sciatic nerve in dogs. They demonstrated that the protoplasmic bands which form, bridge the gap within six days and that the regenerated neuraxes from the proximal stump penetrate the distal segment within three weeks.

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Huber³ has called attention to the importance of the nerve pattern; this he has likened to a conduit system, each tube of the system leading to some definite point. In the nerve, the fibrous framework, of which the endoneurium represents the finest subdivisions, represents the conduit, and the contained neuraxone, with its myelin sheath and enveloping neurilemma, the insulated electric wire. In the regeneration of nerve fibers, the protoplasmic bands, formed by the proliferating neurilemma cells supported by the endoneurium, are comparable to the empty tubes of a conduit system, some leading to motor end-plates, some to sensory end-organs. If the distal segment of the nerve were rotated so that the patterns of the distal and proximal segments no longer coincided, then motor nerves might find their way down sensory pathways and sensory nerves might find their way to motor organs and thus be as effectually lost from the functional standpoint as though they had never been regenerated.

Miller⁴ has recently correlated the microscopic changes in the process of nerve regeneration with the gross changes and with the restoration of the tensile strength of the nerve at the point of suture. He summarizes his findings as follows:

"At the end of the first week after suture, the plastic exudate is beginning to organize. There is degeneration of axis cylinders and medullary sheaths in the area immediately adjacent to the exudate; protoplasmic bands have partly bridged the gap, but the new neuraxes have not as yet penetrated the scar. The weight necessary to separate the two segments at this stage falls below 1,000 gm., the average for nerves of different diameters being 574 gm.

"After two weeks: At the end of the second week, a marked change has occurred. The exudate has become a well organized scar, which has increased the diameter of the nerve about 2 mm. Degeneration in the proximal stump has ceased, and the new neuraxes have not only entered the scar but have formed a dense network there. A few have even penetrated the distal segment. The strength of the suture line has increased enormously. A very small nerve (1.5-2 mm. diameter) now supports 1,665 gm.; a medium sized nerve (3-4 mm.) on an average, 4,271 gm.; and a large 5 mm. nerve, 4,471 gm.

"After three weeks: The change in tensile strength is less marked. Practically all the new neuraxes have entered the distal segment and have begun their downward growth within the protoplasmic bands. The strength of the suture line at this period, though not much greater than at the end of two weeks, is becoming more directly proportional to the diameter of the nerve, and the line of separation, instead of always being a clean-cut transverse break, is frayed and irregular. The silk stitches have now become less of a factor than in the earlier days. As a rule they can be readily picked off the surface of the scar with forceps.

"After four weeks: We should expect from the histology of the changes which have occurred at this time to find the suture line very strong, inasmuch as the scar is completely healed, and made up of cable-like bundles of new, well developed fibers surrounded by organized connective tissue. On Dog 46, a husky animal, a bilateral suture of the sciatic nerve was performed. The right sciatic nerve supported 9,202 gm., while the left nerve broke, not at the suture line, but where the forceps were attached.

"After five weeks: The process of repair is complete. The strength of the suture line has now become as great as we should expect it to be even at the end of the sixth, seventh or eighth week. Actually there has been little change in the tensile strength for the past two weeks, but the direct ratio between the size of the nerve and its strength at the suture line has become better established."

To summarize the process of nerve regeneration, we may say that the neuraxes arise from intact proximal nerve fibrillæ and cross the suture line peripheralward in protoplasmic bands, which arise by proliferation of the cells of the neurilemma, which bridge the gap and replace the original nerve trunk. The point of nerve section, if adequately sutured, is bridged and practically restored to normal within four weeks.

TECHNIQUE OF OPERATIVE REPAIR

Before the war there were many methods for the repair of peripheral nerves by operative measures, most of them faulty and yielding very poor results. At present there are but three surgical methods which are at all worthy of consideration, namely: end-to-end suture; the so-called cable-graft, and the fascial tube.

Of these, the first is by all means of greatest importance; the other two should be used only when end-to-end suture cannot be obtained. In performing the operation of end-to-end suture, it is essential to permit the ends of the nerve to come into actual contact without undue tension. In many instances, this may be done without trouble. Many times, however, the gap to be bridged will make it impossible to approximate the nerve ends without resorting to other measures. There are in general four aids which we may employ.

First, mobilization. For this purpose, a long incision is made in the course of the nerve and the nerve is dissected free from all attachments. Much more may be gained in this manner than by attempting to stretch the nerve without first dissecting it free.

Second, transposition. By this, we mean changing the course of the nerve, as, for instance, transposing the ulnar from the posterior to the anterior

side of the elbow joint, thus lessening the distance which it must cover.

Third and Fourth, flexion of joints and adduction of limbs. For instance, in the case of suture of the sciatic, by flexing the knee, two to four additional inches of nerve may be mobilized, and in the case of the musculospiral, by adduction of the arm 0.5 to 2 cm. may be gained.

A fifth method may also be of great assistance. In case none of the four above mentioned suffices, it is wise at times to suture the fibrous ends of the divided nerve as near together as may be, with the limb strongly flexed, and then by gradually extending the limb, in the course of several weeks, so stretch the nerve that upon secondary operation it may be possible to resect the scar tissue and obtain direct end-to-end suture. Some surgeons have practiced resection of segments of bone in order to shorten the limb and thus permit approximation of severed nerve trunks. This measure must be very rarely indicated, and is here mentioned largely for its historical interest.

Adopting the methods of securing end-to-end suture just enumerated, Naffziger⁷ considers the following figures to represent the average of distances which may be bridged:

For the ulnar nerve: mobilization alone—3 cm., mobilization and transposition—4.5 cm. Adduction of the arm permits a slight additional gain and mobilization, transposition, adduction, and complete flexion of elbow and wrist, 10 cm.

Musculospiral: mobilization—2 cm., with elbow flexion, 8 cm., adduction adds .5 cm., mobilization, elbow flexion, transposition and adduction—10 cm.

Median: mobilization—2 cm., mobilization, adduction and elbow flexion, 9 cm.

Sciatic, internal and external popliteal trunks: mobilization—3 cm.; mobilization, extension at the hip and flexion at the knee, 9.5 to 10 cm.

These figures represent distances which may be bridged at one-stage operations. With two-stage performances, additional gains may be made. Naffziger also stresses the importance of preserving the nerve pattern during these maneuvers so that sensory nerves may not grow down motor pathways.

When sufficient length of nerve trunk has been secured, the ends of the nerve segments should be cut off above any infiltrating scar tissue and gently approximated. As suture material, either fine waxed silk or fine plain catgut may be used. In large nerves it may be permissible to pass one or

two sutures directly through the nerve trunk. Otherwise, the sutures are passed through the epineurium. It is important that the nerve ends be not jammed together too tightly by the suture, as this may tend to curl the ends up or crush them, thus disturbing the nerve pattern and throwing out a barrier in the pathway of the down-growing neuraxes.

The cable-graft method consists in sewing into the gap between the nerve ends segments of some sensory nerve. As the sensory nerves chosen are usually less in diameter than the nerve which is to be repaired, one may actually make a cable of the sensory nerve by implanting 3 or 4 or more segments side by side in the space to be bridged, these segments of nerve being regarded exactly as segments of a conduit system. The objections to this method are that it requires at least two incisions; one to expose the nerve to be repaired, and the other to expose the nerve to be transplanted; it involves the formation of two suture lines, and, as has been pointed out by Lewis,⁸ the distal suture line may cicatrize and block the down-growing neuraxes after they have successfully passed the first suture line, necessitating a second operation with resection of the obstructing cicatrix and resuture; it involves the complete cutting away of tissues from one part of the body and their transplantation to another part entirely removed from their blood supply, so that the tendency to necrosis and therefore disappearance of the transplanted tissue is great.

The fascial tube will rarely be necessary, in view of the two methods just discussed. Its great objection is that, if the space to be bridged is relatively short, the fascial tube will not be needed, while if the distance is too great to be bridged by any other method, it will probably be so great that the fascial tube would become transformed into dense scar tissue before the regenerating nerve tissue could transverse its entire length. At best, it is a measure fraught with great uncertainty.

Following a technically successful nerve suture, how long may we wait before pronouncing it a failure? If signs of returning function do not appear in from three to six months, it is wise to make a second operation and examine the condition of the nerve at the point of suture. This is recommended for the following reason: Muscles which remain inactive through the loss of their normal nerve supply for prolonged periods are very prone to atrophy to such an extent that even though the normal nerve impulse is eventually re-established, the

muscle is no longer capable of functional activity or of regeneration. We now have at our command methods by which we can determine at a second operation whether or not neuraxes have crossed the line of suture and are growing down the distal segment. If, upon exposing such a nerve, we discover that its continuity is interrupted by contracting scar tissue or some other pathological condition at the line of suture, we can resect the affected portion and perform a new suture with good prospects of success and thus avoid the long period of disability formerly recommended. In determining whether or not the neuraxes have crossed the suture line, use is made of the fact, emphasized by Malone,⁷ that stimulation of intact sensory or mixed nerves causes reflex stimulation of respiration. If upon exposing the nerve trunk which has been sutured some months previously and applying a threshold stimulus, 2 cm. or more distal to the suture line, we get no effect upon respiration, it is conclusive evidence that regeneration beyond the line of suture has not occurred and resection of the scar with resuture is then indicated. If, however, reflex respiratory stimulation appears we know that nerve fibers have crossed the suture line and are on their way down the new nerve trunk. This test is of no service in a motor nerve, such as the facial, but is applicable to any sensory or mixed nerve.

Failure in nerve suture may be due to cicatrization, to improper technique, to hemorrhage and cyst formation.

Cicatrices may result from involvement of the suture line in adjacent scar tissue and, in several cases, have resulted from replacement fibrosis of the strips of fat and fascia which had been wrapped around the suture line. To prevent scar tissue formation, it is probably better to refrain from using the fat and fascia strip and to endeavor to place the sutured nerve in normal tissues, preferably in an intermuscular plane.

Under the heading of "Improper Technique," we would consider the twisting of nerves, thus disturbing the nerve pattern; too tight suturing, thus crushing the nerve, disturbing the nerve pattern, and folding the nerve on itself; subjecting the suture line to excessive tension, so that the nerve ends are pulled apart, permitting interposition of scar tissue.

Hemorrhage and cyst formation—the latter probably is secondary to the former. Hemorrhage occurs between the sutured ends, the resultant blood clot may be entirely absorbed, it may be replaced

by scar tissue, or, if large, it may be encapsulated by connective tissue; under the latter circumstance, the center of the clot may be gradually digested and replaced by liquid, thus forming a cyst.

Under any of the above circumstances, a secondary operation with excision of the faulty suture line and resuture is indicated. It sometimes happens that a portion only of the diameter of the nerve is involved in these changes, the remainder of the nerve being intact; in these cases it is probably wise to conserve the uninvolved portion by making the so-called partial resection and suture. In this procedure, the nerve is cut transversely only to the depth of the scar, the scar is excised, and the nerve ends mobilized by splitting the nerve trunk longitudinally at the level of the depths of the excision so that the normal portion of the nerve may freely loop on itself when the whole trunk is shortened by the approximation of the nerve ends.

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RECTAL APPROACH TO PELVIC ABSCESS COMPLICATING ACUTE APPENDICITIS*

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Rectal approach is often the operation of choice in evacuating a large pelvic abscess complicating acute appendicitis, especially in young children coming to the surgeon in extremis and presenting a large fluctuant mass bulging on the anterior rectal wall. Also, it is often the wisest course in post-operative ruptured appendix cases in which drainage has been inadequate and a pelvic abscess has formed.

Our cases reported here are all of the first group and came to us in such desperate shape that an

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immediate appendectomy seemed only to lessen chances for survival. A case of the second group ought never to occur. In several hundred appendectomies, we have never found a rectal incision necessary for secondary postoperative pelvic abscess, cigarette and tube drain through a stab in the side with one tube deep in the cul-de-sac having invariably proved adequate drainage in our experience.

Eliot and Pickardt,¹ in ten years' experience, had no secondary postoperative abscesses. They claim invariably adequate drainage using tube and gauze the first thirty-six hours, after which the drains are removed, and a soft Nelaton catheter introduced into the sinus daily, beginning irrigation on the fourth day. Healing of the sinus is thus hastened to twenty days and they claim for their drainage the preclusion of the necessity of later rectal or vaginal drainage for formation of pelvic abscess.

MacLaren² has greatly lessened the incidence of secondary postoperative abscess formation by Van Buren Knotts' suggestion. Immediately after the removal of the appendix he makes a secondary stab wound just above the pubes and inserts two large-sized rubber tubes to the bottom of the rectovesicle peritoneal pouch. However, he claims there will still be a few cases necessitating rectal puncture in order to save. He lays stress on the cases in the first group, those requiring primary rectal incision, cases reaching the surgeon exhausted with a large abscess filling the pelvis, usually in children.

Symptomatology.—Bosch-Arana³ attributes the abscess to an appendix in close proximity to the pouch of Douglas or a lymphangitis of appendicular origin. The symptoms suggest renal colic or acute colitis. Four cardinal symptoms are named: (1) hypogastric pain; (2) painful polyuria; (3) pain in lumbar region; (4) intestinal colic, with frequent desire to defecate.

We have always found one or more of these four symptoms present. While the histories as quoted below do not always record this point, our impression has been that there is nearly always present a severe tenesmus with the passage of slime.

Operation.—Bosch-Arana³ makes an exploratory incision, then opens the abscess by a horizontal incision, thus avoiding the hemorrhoidal arteries. Two tubes are inserted, one for injecting antiseptic

solutions and one for expelling, and the abscess is irrigated two or three times daily. He prefers this approach both for preoperative and postoperative secondary pelvic abscesses in both male and female, claiming no reinfection of the abscess cavity from the rectum, practically no operative mortality, and a shortening of the convalescence by twenty to thirty days over the suprapubic route.

Our own operation is simpler. Usually no retractor or speculum is needed. Under gas anesthesia or no anesthesia at all, one merely guides a sharp-pointed scissors on the index finger through the rectum and thrusts it into the abscess cavity. The finger enters the cavity, explores, and on the finger as a guide a tube is easily inserted. This tube is left in rarely longer than twenty-four to forty-eight hours. However, after its removal, it is well to examine the rectum daily to see that the sinus remains open until the cavity is obliterated.

Discussion.—Our cases were all in the first group mentioned above: primary operation in very sick children. In eight years' time, out of many cases of acute appendicitis with abscess, there were only ten cases which justified this procedure. The last case, given below for the interest attached, proved later to be tuberculous peritonitis. Six were male and four female. Ages ranged from four to twenty-four; fifty per cent of them were between the ages of eleven and twelve.

In a few selected cases, rectal incision is undoubtedly the safest and least shock-producing of any method of drainage. Even in females, too, especially in young girls, we prefer rectal to vaginal approach. The drainage is perfect; there is no danger of reinfection of the abscess cavity from the rectum; the cavity closes very quickly.

It is often astonishing to see how rapidly a desperate case rallies after this method of drainage (witness Case 12581). For the later removal of the appendix, one is able to approach the appendix earlier and through a clean field, which is rarely the case where one has opened the abdomen. This latter point need not be stressed, however, because rarely does one open the abdomen without being able to remove the appendix.

Usually, from the history, one can tell what patients he will be able to drain in this way, and only those cases that on rectal examination present a bulging, rather tense mass, is it safe to thus open. We have, not rarely, waited more than a day, just as we do in pelvic infection in females before making a vaginal cul-de-sac incision. Indeed, we have

¹ Eliot and Pickardt: *Ann. of Surg.*, lxxiv, 43, p. 430.

² MacLaren, A.: *Journal-Lancet*, May 1, 1913.

³ Bosch-Arana, G.: *Semana Med.*, 1921, xxviii, 569.

seen one case killed by another operator by neglecting to wait and thrusting an instrument into the small intestines though there was a pelvic abscess present.

MacLaren quotes Lincoln Davis of the Massachusetts General Hospital, "These patients must be carefully watched and if the improvement in symptoms is not definite and continuous, they must be opened from above. The method is ideal only for large pelvic abscesses, when the appendix is itself pelvic in position."

CASE 12397. Male. Age 24.

Diagnosis: Acute appendicitis (perforated); general peritonitis; pelvic abscess.

Pain was present in the lower abdomen with vomiting, frequency of urination, pain in the left loin radiating into the left groin, tenesmus, and diarrhea. No fever was present. Outside, the diagnosis was renal colic. When first seen in consultation he presented a Hippocratic facies, dry tongue, generalized abdominal distension and rigidity, with tenderness in the left lower quadrant. Per rectum an abscess could be felt pointing in the cul-de-sac. Temperature 102° (mouth). W. B. C. 18,000.

Under gas the abscess was punctured per rectum but as this did not seem to reduce the mass sufficiently the abdomen was also opened and appendix found ruptured and bowels distended. Two tubes were put in the parietic ileum and the wound was left wide open and copious wet dressing applied. Wicks and gauze were packed into the wound to establish drainage. The patient made a slow but uneventful recovery.

CASE 10798. Male. Age 11.

Diagnosis: Acute appendicitis; pelvic abscess.

Nineteen days ago the patient had a generalized abdominal pain with vomiting; pain later localized in lower left side. A few days later he felt better; then the pain returned and vomiting became worse.

On entrance the patient was extremely emaciated, eyes sunken, pulse rapid and weak; the abdomen was distended, tense and tender. Dullness existed over the whole lower abdomen to the umbilicus and on the right almost to the liver. The liver dullness was obliterated by tympany. A round mass was felt per rectum bulging the anterior wall. Temperature 101° (rectal). W. B. C. 32,000.

Under gas the abscess was drained per rectum through a stab wound. A large amount of foul pus was evacuated.

His temperature was normal in two days and the patient sitting up. An uneventful convalescence took place and the patient went home thirteen days after drainage was instituted.

Case 8124. Male. Age 12.

Diagnosis: Acute appendicitis; pelvic abscess; general peritonitis.

One week ago sickness began with a chill, abdominal cramps, nausea, and later fecal vomiting, hematemesis and diarrhea. Constipation persisted after the fourth day despite catharsis and enemas.

The patient showed slight distension and tenderness in the lower abdomen, especially in the lower left quadrant.

Rectal examination was negative on entrance. Temperature 101.8° (rectal). W. B. C. 14,000.

Six days later a pelvic abscess was felt per rectum and was opened under gas per rectum. Temperature dropped to normal the next day.

Twenty days later appendectomy was performed. At operation a few adhesions were found at the site of the rectal drainage.

The patient made an uneventful recovery and was discharged three weeks later.

CASE 7685. Female. Age 12.

Diagnosis: Acute appendicitis; pelvic abscess.

The patient has suffered from five previous attacks of acute abdominal pain during the past four years.

Eleven days ago a sudden, general abdominal pain with vomiting appeared. Pain and tenderness gradually worked down into the lower left side and later into both lower quadrants. Finally she had pain only when the bladder was distended, and suffered from dysuria and frequency. The bowels were very constipated.

On examination the patient appeared emaciated. Pulse rapid. Temperature 103°. W. B. C. 20,000. The abdomen was slightly distended and generally tender. Under ether, a mass was felt bimanually per rectum extending above the pubes and right Poupart's ligament, half way to the umbilicus. The masses in the abdomen and in the rectum were felt to be continuous.

Under ether the abscess was drained per rectum. The temperature immediately fell to normal.

Nine days later appendectomy was performed in the usual way. The appendix found burst at the tip, with mucosa ulcerated, a few drops of free pus about it, and the omentum adherent to the brim of the pelvis. Convalescence was uneventful.

CASE 7263. Male. Age 20.

Diagnosis: Acute appendicitis; pelvic abscess.

Twelve days ago the trouble began with vertigo, vomiting and diarrhea. The next day fleeting, cramping pains appeared in the lower abdomen. Vomiting and pain have persisted and the last two days flatus and tenesmus have been present.

On entrance an indefinite mass was felt in the lower left quadrant, and per rectum a non-fluctuant mass in the pelvis. Patient was put to bed with head elevated and restricted to liquid diet. Enemas were resorted to. In two days' time both the mass per rectum and mass in lower quadrant became larger and distinctly fluctuant. Temperature 101° (rectal). W. B. C. 25,000.

Under gas, abscess was punctured per rectum; about 180 c.c. of foul pus were obtained, but this did not reduce the size of the mass very much. Another extraperitoneal incision was made above the left inguinal ligament and a huge quantity of pus liberated. A thick wall of tissue was then left between the two abscesses. The temperature dropped to normal two days later and uneventful convalescence began.

CASE 5952. Male. Age 4.

Diagnosis: Acute appendicitis (perforated); appendiceal abscess; pelvic abscess; measles.

Nine days ago the patient was seized by a sudden pain in the epigastrium, accompanied by vomiting and diarrhea. In a few hours the pain was localized in the right lower

quadrant, gradually abating in severity for the next two days. Constipation and difficulty in starting urination have been present the past few days. Fever has ranged between 100° and 102° for the past week.

The little patient was thin and strained looking. A huge tender fluctuant mass was palpated bimanually per rectum, reaching from the pubes to the umbilicus and filling the lower right quadrant. Temperature 101° (rectal). W. B. C. 27,000.

Under gas the abscess was drained per rectum. The temperature immediately fell to normal.

Ten days later appendectomy was performed in the usual manner and the appendix was found lying adherent and deep in the pelvis. No free pus was found about the appendix, and the bowels were not inflamed except just about it. There was a fecal stone in the mid portion of the appendix with a perforation proximal to it. The appendiceal mucosa was inflamed.

The patient contracted measles during convalescence but was discharged well.

CASE 5014. Female. Age 8.

Diagnosis: Acute appendicitis; pelvic abscess.

This patient was operated on three years ago for perforated appendix, abscess and general peritonitis. Nine days ago she was seized by a sudden abdominal pain, vomiting and headache. The pain was less severe for three days until twelve hours ago, when it again began very severe. Diarrhea persisted five to six times daily with very painful defecation.

Examination showed tenderness over lower abdomen and in pelvis. A large fluctuating mass was felt per rectum impinging on the anterior wall. Temperature 101.5° (mouth). W. B. C. not given.

The abscess was drained per rectum. The temperature fell immediately to normal. The patient was sent home ten days later feeling well, with slight discharge persisting through the open sinus in the rectum.

CASE 12584. Female. Age 4½ years.

Diagnosis: Acute appendicitis (perforated); pelvic abscess.

The onset was sudden with abdominal pain, vomiting, and diarrhea, followed by constipation. Then diarrhea returned, accompanied by marked tenesmus. Retention and dribbling of urine followed.

The abdomen was distended to the umbilicus. Rectal examination revealed a soft fluctuant mass pressing on the anterior rectal wall. Temperature 101.6° (rectal). W. B. C. 22,000.

Under ether, the pelvic abscess was punctured and drained per rectum. Next day the temperature was normal. Six days later there was no discharge per rectum and the patient was discharged well eight days after drainage.

CASE 13340. Female. Age 11.

Diagnosis: Pelvic abscess (due to throat infection or appendicitis); abdominal abscess (right).

Six days after the patient developed a sore throat, headache, nausea, and vomiting. Three days later she complained of general abdominal pain, most marked in the lower right quadrant, with great tenderness in the same region. Vomiting became more severe.

The patient appeared very sick, tongue dry, eyes sunken,

pulse rapid, and abdomen distended, tense, and tender everywhere, especially in the lower right quadrant. Temperature 103° (rectal). W. B. C. 19,800.

The patient's condition was so critical that she was put on expectant treatment for six days with the head of the bed elevated, Murphy drip, sips of water, morphine, and turpentine stupes. On the fourth day after entrance a mass was palpable above the pubes and right inguinal ligament, and per rectum a bulging was felt above the cul-de-sac. On this day the patient began to have frequent slimy stools and much flatus. She continued to run a high fever and was losing flesh rapidly. W. B. C. 36,000.*

Six days after entrance the pelvic abscess was drained per rectum under gas and much foul pus obtained. This procedure had no effect on the temperature, and vomiting continued. Seven days after operation the mass per rectum had disappeared but a distinct mass was palpable in the right loin. This new abscess was opened under gas and found to extend up under the liver and deep into the loin. The patient died the next day.

CASE 14576. Female. Age 12.

Diagnosis: Acute appendicitis; pelvic abscess; general peritonitis; lobar pneumonia.

No history obtained.

Crackling râles were heard at the lung bases on entrance. The abdomen was slightly distended. General spasm and tenderness of the whole abdomen were present, more marked in the right iliac fossa. Per rectum a mass was felt bi-manually in the pelvis. Temperature 104° (rectal). W. B. C. 14,000.

Under ether this mass was punctured and drained per rectum. With the finger in the abscess cavity, the coils of the intestine could be felt through the abscess wall. A tube was left in the cavity and the wound packed on account of considerable bleeding. Next morning the temperature was normal and the clinical condition improved. Two days later, however, the patient developed a frank lobar pneumonia and died.

CASE 8026. Female. Age 14.

Diagnosis: Tuberculous peritonitis?

This history elicited repeated attacks of pain in the right lower quadrant, nausea, vomiting and fever, with no relation to the menses.

The abdomen was found distended, with tenderness over McBurney's point, and spasticity of the right rectus. Temperature 102° (rectal). W. B. C. 20,000.

Under ether the rectum was dilated and a mass was felt about the size of an orange, behind the uterus. This was punctured and a clear watery fluid escaped. The question was now raised, was this a case of ovarian cyst with twisted pedicle, or of appendicitis with a simple ovarian cyst?

However, the temperature stayed around 102°, the abdomen remained distended, but no masses were palpable and no tenderness was present. The W. B. C. fell to 10,400 three days after rectal puncture. About a month later the temperature was normal but a fluctuant mass was beginning to fill up the abdomen reaching to the umbilicus. This mass was incised and drained and creamy pus of a sweetish

*A white blood count above 35,000, or even 30,000, in peritonitis rather discounts appendicitis as the cause. Suspect a pneumococcal infection. (See Br. Med. Jour., Mar. 4, 1922, page 347.)

odor was evacuated. Two months later the sinus was still discharging slightly but the patient was up and about at home with a normal temperature.

THE RAT AND HUMAN DISEASE

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The enormous economic losses due to rats have been considerably emphasized within the past few years. It has been conservatively estimated that the cities of the United States lose \$35,000,000 annually from the depredations of these rodents. An equally conservative estimate would place the annual loss for feeding the rats of the Twin Cities at \$150,000 without regard to the damage to food and property additional to what was eaten.

A phase of the rat problem which is wholly unappreciated by the general public is that of the relation of this pest to the health of man. Indeed, outside of the localities where there have been outbreaks of bubonic plague, even the physicians of this country take little account of the rat as a factor in the spread of disease. It is the purpose of this paper to call attention to some of the most definite ways in which these rodents may affect the health of man.

In common with a number of other animals, rats may convey pathogenic organisms in two different ways. In the first place, they may serve as purely *accidental carriers*, or, secondly, they may be *natural hosts* of parasites which may be transmissible also to man.

Frequenting privies, drains, garbage heaps and the like, the habits and environment of rats are such that they may readily transfer the germs of various intestinal diseases to the food and drink of man. In a similar way, they may spread ptomaines and various destructive molds and other fungi. Few accurate data regarding this aspect of the problem are available, but it is obvious that simple accidental carriage of contaminations must be reckoned with.

Much more serious are the cases where the rat itself serves as the host of the pathogenic organism, be it bacterial or animal in nature. The method by which the parasite is transmitted to other rats or to man may be either direct or indirect, depending upon the species.

Foremost in importance among the rat diseases

transmissible stands the bubonic plague. The common view that this is a disease of warm climates and that northern regions need not concern themselves regarding it has no basis in fact. It is now universally recognized by students of the disease that it causes an epizootic among rats and other rodents and that it spreads to man by the agency of fleas.

Weil's disease, or spirochetal jaundice, is another widespread disease of man which only within the past few years has been definitely traced to rats. The causal organism, *leptospira icterohemorrhagiae* was discovered in 1915 in the urine and kidneys of wild rats in Japan. The findings of the Japanese investigators have been abundantly confirmed by workers in various parts of the world, including the United States. It is believed that the organism escaping in the animal's urine is transmitted to man from contaminated soil, or through food or drink.

A related disease is the so-called "rat-bite fever," or "sodoku," a relapsing fever of long duration which sometimes follows a rat-bite. The causative organism *spirochaudinnia morsumuris*, lives in the mouth of the animal.

Rats are subject to certain epidemic diseases which very closely simulate paratyphoid and which are sometimes intentionally spread by the use of various commercial "rat viruses." It has been assumed that the causative organisms were harmless to man, but in recent years evidence has accumulated which indicates that serious sickness and even death of man may be caused by it.

Rosenau (1910) says: "There is practically no difference between the *bacillus typhi murium* and the paratyphoid bacillus, which is the well-known cause of meat poisoning, and the *bacillus enteridion* of Jarbues, which is associated with intestinal disorders."

Both rats and mice are at times affected by a favus which is occasionally transmissible to man, sometimes indirectly through cats which have preyed upon the diseased rodents. Formerly, the causative organism was generally regarded as identical with that of typical favus of man, *achorion schoeini*, but it is now separated as *achorion quinckeanum*.

Of protozoa, rats and mice not infrequently harbor pathogenic amebæ, which very closely resemble the entamebæ of man. In fact, recent experimental work, notably that of Lynch (1915) and of Brug (1919) have shown that rats may be infected

by the *entameba dysenteriae* from man and have strongly supported the view that in nature these rodents may be a very definite factor in the spread of these organisms.

Many workers regard the flagellate protozoan parasites *giardia intestinalis* (*Lamblia*) and *trichomonas intestinalis* of man as identical with species commonly found in rodents. The evidence is especially definite in the case of *giardia*, which is now recognized as a fairly common intestinal parasite of man in this country, as well as elsewhere.

Of the grosser parasites, the rat harbors at least two species of tapeworm which are transmissible to man. Indeed, one of these, the dwarf tapeworm, *hymenolepis nana*, is the most common tapeworm of man in the United States. On account of its small size, 10-15 mm. in length by 0.5-0.7 mm. in breadth, this worm had been very generally overlooked, and had been regarded as a great rarity in man, until the extensive microscopic examinations of stools in connection with hookworm studies.

Hymenolepis nana is almost unique among tapeworms in that it can complete its development in a single host. I have repeatedly verified Grassi's statement that the eggs taken up by a rat develop into a cysticercus in the intestinal villi and that this larval form then transforms into the adult tapeworm in the lumen of the intestine of the same individual host.

A much larger representative of the genus *hymenolepis*, which is also found in these rodents, is *hymenolepis diminuta*. I have found this tapeworm in 14 per cent of the rats examined in Minneapolis and St. Paul. Moll (1917) reports it in five out of twenty-five examinations at Madison, Wisconsin. This species, like most tapeworms, requires two hosts to complete its development. The intermediate host in this case is any one of several meal-infesting insects, or, very often, the rat flea. Rarely it occurs as a parasite of man, the infection being mostly among infants and children.

A most striking case in St. Paul recently came to my attention. An infant nine months old began to discharge segments of this species of tapeworm. On treatment, several months later, it discharged some twenty-five worms. As a seven-months-old babe, it had been allowed to crawl about in the yard a great deal and had there had opportunity to pick up infected insects which, on their part, had taken up the tapeworm embryos discharged by rats or mice.

It is notorious that rats are the chief carriers of

the dangerous trichina. Indeed, it is highly probable that these rodents are the normal host for this nematode. I usually obtain my supply of the parasite for experimental study from rats trapped about slaughter houses. Under such conditions I have sometimes found over 60 per cent of the rats infested.

Stiles, in 1910, wrote regarding trichinosis in man, "This disease will probably never be eradicated from man until rats and mice are practically eradicated, and any rational public-health campaign directed against trichinosis must take the rat into serious consideration. The eradication of rats and mice would be a very substantial contribution toward a reduction and eradication of trichinosis."

Another nematode worm, *syphacia obvelata*, which is closely related to the *oxyuris vermicularis* of man, has been shown recently (Riley, 1919) to be transmissible from rats and mice to man.

Gigantorhynchus moniliformis, one of the thorn-headed worms which inhabits the small intestine of rats and various small mammals, requires a certain beetle (*Blaps*) as intermediate host. The worm has been reported for man, and Calandruccio infected himself experimentally with larval worms taken from the beetle.

As far as is known, there are none of the mites attacking man in this country which are normally parasitic on rodents. The famous "akamushi mite" of Japan, which causes "Japanese river fever," is, to a large extent, dependent upon such hosts.

Obviously, rat fleas attack man, for it is through them that bubonic plague is transmitted from the diseased rodent. Fortunately, infestations of houses in this region are not usually by these species, as they prefer the rat as long as it is alive.

The list here given by no means includes all of the parasites which have been suggested to be identical in man and rodents. It deals primarily with clearly established cases and is sufficient to emphasize the fact that, for reasons of public health as well as for economic reasons, attempts at rat extermination should receive whole-hearted support.

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CASE REPORTS

REPORT OF A CASE OF ABSCESS OF THE TRANSVERSE SINUS WITH HEMOLYTIC STREPTOCOCCEMIA, OPERATION, AND RECOVERY

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The patient, a girl eight years old, was first seen on the fourteenth day of May, 1921. Her past history was unimportant. Early in April she became ill with a mild respiratory infection, during which there was slight pain in the left ear for a day or so, but no discharge. Convalescence was uneventful and nothing further was noted until the middle of April, when she again had temperature for a few days and developed a cervical adenitis; there was no ear involvement at this time. On May 1, while the patient was apparently in good health, the left ear began to ache, and four days later a scanty, bloody discharge made its appearance in the canal; the temperature was 103. Paracentesis was done with relief of most of the pain and decrease in temperature; the pain did not, however, completely disappear and the temperature did not return to normal. On May 8, on account of increase in temperature and the appearance of mastoid tenderness, mastoidectomy was done; temperature on the day of operation ranged from 102 to 105.

The first two days after operation were uneventful, the temperature varying from 102.5 to 105. On the evening of the third day the patient experienced a chill lasting about ten minutes, which was followed by a temperature of 105 and a pulse rate of 174; the temperature dropped to 100 in eight hours. On the morning of the fourth day there was another chill, followed by a temperature of 106, a pulse rate of 174, and a respiratory rate of fifty. Normal was reached again in eight hours. On the evening of the same day there was another chill, followed by a temperature of

105.5, a pulse rate of 160, and a respiratory rate of 42. Normal was reached in eight hours. At noon on the fifth day there was a slight chill, lasting perhaps three minutes, followed by a temperature of 105, a pulse rate of 146, and a respiratory rate of 42; normal was not reached for twenty-four hours. Following this last chill, paracentesis was done under gas anesthesia.

The patient was seen in consultation on the evening of the fifth postoperative day. She appeared acutely ill. The face was flushed, the respirations were rapid and labored, with an expiratory grunt, and the pulse was soft and rapid. The temperature was 104, the pulse rate 146, and the respiratory rate 42. There was definite pain in the left lower axillary region, worse on inspiration. Slight abdominal distension was noted and there was present a moderate cervical adenitis. There was present in the auditory canal a scanty, sero-sanguinous discharge; inspection of the post-auricular wound showed the mastoid well exenterated and the antrum adequately drained. The white blood count was 24,900.

Nothing was done that night and the patient was seen again at noon the following day. There had been no more chills; the pain in the side, though still present, was less, and the temperature had dropped from 104 the preceding evening to normal. Upon these findings, immediate operation was deferred and a blood culture was taken (seventh postoperative day). The next three days, the seventh, eighth and ninth postoperative days, the condition remained unchanged. The temperature varied from 99 to 105, the pulse remained rapid, and the respirations somewhat accelerated; the pain in the left side was present at intervals, a slight rub was heard low in the anterior axillary line, the spleen was enlarged and tender and some abdominal distension was noted most of the time. These findings, it was felt, pointed to a probable localized pleural infection or a splenic infarct. There were no more chills and the condition of the ear and post-auricular wound remained unchanged.

The blood culture was reported positive for hemolytic streptococcus on the evening of the eighth postoperative day. On this finding operation was decided upon and performed the next day. The mastoid wound was explored and satisfactory exenteration and antrum drainage found. On uncovering the sinus plate, definite evidence of pathological change was observed. Instead of the firm, white bone of a normal sinus plate, there was found a tough, rubbery plate of bone, deep yellow in color, which yielded under slight pressure and felt very much like a thick, fibrous membrane.

The mastoid wound was temporarily covered and the internal jugular vein exposed just below the entrance of the common facial; the latter was divided between ligatures, as was the internal jugular vein below the common facial. The jugular seemed quite normal so far as could be seen in the neck dissection; the wound was closed without drainage.

The mastoid area was again entered. The sinus was uncovered well back toward the confluens sinuum and down toward the bulb as far as possible. When the sinus wall was incised, the lumen of the vessel was found full of a thick, greenish yellow pus; there was no flow of blood. The wall was cut away to the margin of the bone dissec-

tion and each end of the sinus gently curetted. This procedure was followed by a free gush of blood from the distal end and a slight flow from the bulbar end. In view of the extensive dissection necessary to expose the bulb completely, and on account of the normal vein in the neck and the partial flow already obtained from the bulbar end, the dissection was not carried further. The wound was packed with iodoform gauze and left open. The patient suffered very little shock from this procedure and was returned from the operating room in good condition.

The course during the next few days was uneventful; the temperature showed wide variations, ranging from 99 and 100 to 104 and, at times, 105; on the second post-operative day and again on the third, slight chills were noted, followed each time by a temperature of 104. The abdominal distension varied somewhat, some days being almost absent. There was occasional pain in the left chest. The mastoid wound drained moderately; a slight discharge was noted also from the neck wound.

During the two weeks following the operation the patient maintained her nutrition fairly well. The temperature did not show so many high peaks and some progress seemed to be evident. During the third week, while there were no new complications, the patient did not seem to be making any additional progress. An injection of whole blood, taken from the mother, was given intramuscularly in the hope of stimulating resistance. The effect of this procedure was problematical. The injection did seem to influence the course of the disease slightly. The temperature was a little lower during the next few days and the general condition better. During the fourth week, the condition of the patient was such that she was permitted to be up for a short time daily in a wheel chair.

On July 2, at the beginning of the seventh postoperative week, the patient developed lobar pneumonia of the left lower lobe. This resolved by lysis and by the end of the eighth week the lungs had almost cleared and the condition was good. But at the end of another week the temperature again became elevated, the patient became septic, and dullness was found at the left base. Exploratory puncture demonstrated thick green pus; this was drained through a catheter, suction of a large syringe and irrigation with Dakin's Solution being used to remove the pus. Hemolytic streptococcus was cultured from this pus.

In late October, after an illness of five months, the patient was recovering slowly, but satisfactorily. The lung cavity was gradually closing in, the patient was up in a wheel chair and out daily, and her temperature ranged from normal in the morning to 100 or 101 in the evening.

About the first of December the patient acquired an acute respiratory infection and during a severe attack of coughing expectorated about fifteen cubic centimeters of gray, yellow sputum, similar to the drainage from the chest wound. She was still having slight evening temperature but was feeling well and gaining weight.

The last report, dated March 18, 1922, shows scanty, intermittent drainage from the chest wound. The patient feels very well, is up and out every pleasant day, and has gained much in weight.

The reason for reporting this case is to record the recovery of a patient suffering with hemolytic streptococcemia. The prognosis in such a condition is always grave, the

mortality being high. But occasional recovery, such as has been recorded in this case, demonstrates that the prognosis is not by any means hopeless. The organism isolated from the blood of the patient was actively hemolytic and was found in the culture in large numbers. The culture was taken forty-eight hours after the last chill so that the presence of organisms in the blood stream at that time would indicate well established infection and not a transient shower of organisms such as may occur at the time of chill in sinus thrombosis cases. The explanation for the recovery of the patient must be found in the shutting off from the general blood stream of the focus in the sinus and the ability of the patient to cope with the infection already present in the blood stream.

The question may naturally be asked, why was not operation done the first time the patient was seen, immediately after the fourth chill. The history of chills was definite and quite typical. There were, however, certain factors which complicated the picture. There was present a cervical adenitis and the invasion of cervical glands by infection following mastoidectomy can give chills strongly simulating those of sinus thrombosis. There was present definite pleural pain, rapid respiration and enlarged spleen, evidence of some acute pulmonary or pleural process, or a splenic infarct. The blood culture had not yet been reported.

The writer feels, in reviewing the case, that too much consideration was given to other processes as possible etiological factors in the septic temperature. The history of four chills following a simple mastoidectomy, in the absence of any other definite cause, is sufficient indication for operative interference in the sinus. The presence of other possible causes does, however, considerably increase the difficulties of diagnosis in suspected thrombosis cases. The same picture, modified by a positive blood culture, leaves, of course, no room for any question as to procedure.

Another point of interest is the occurrence, six weeks after the original infection, of pneumonia and empyema, from which the organism of the original infection was recovered. Was the lung involvement primary in itself or was it a later manifestation of a process initiated at the time of the mastoid trouble six weeks previous? The presence of the same organism would lead one to the latter conclusion.

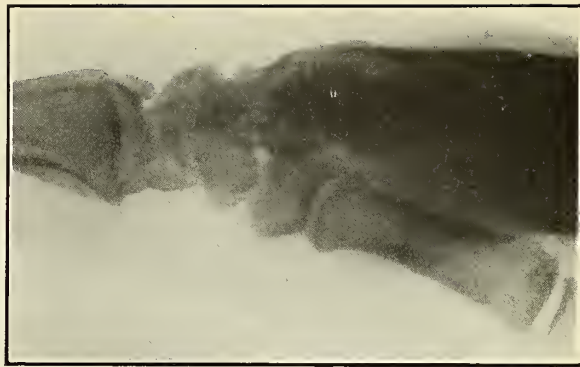
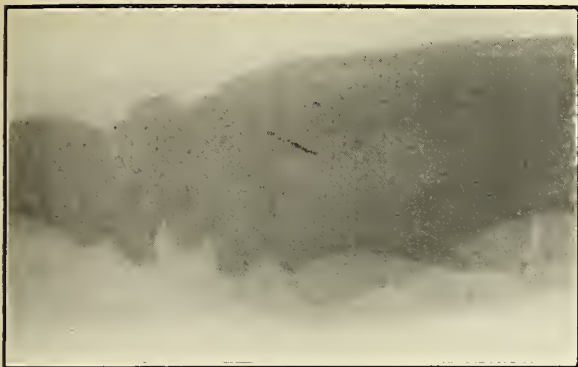
I am indebted to Dr. Charles C. Allen, of Austin, Minn., for permission to report this case and for his notes, both before and after the operation.

A REPORT OF THREE CASES OF DISLOCATED SEMILUNAR BONE

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Judging from the number of reported cases of dislocation of the semilunar bone, it is of rather rare occurrence.

The hospital records of the Minneapolis Gen-



Case No. 1. Before and after reduction under fluoroscope.

eral Hospital were searched back as far as January 1, 1916, and no other case of dislocation of the semilunar bone was found in the records. After getting three of these relatively uncommon cases within a period of six weeks, it was thought worth while to report them.

In searching the literature, we find that Denk found fourteen cases reported between 1910 and 1920, in addition to fifty cases collected by von Frisch previously.

The semilunar bone is placed in the middle of the proximal row of carpal bones and is crescentic in outline. It articulates with the radius above and with the os magnum and trapezoid below the scaphoid laterally and the cuneiform medially. It has a strong volar ligament and a weaker dorsal ligament; hence, it is usually the dorsal ligament that breaks during a dislocation, while the volar one holds.

A dislocation always occurs when the hand is in hyperextension, the dorsal ligament breaking, and the bone being squeezed out of its place anteriorly by being pinched between the head of the os magnum and the end of the radius. These cases ought usually to be recognized without the roentgen ex-

amination, as the semilunar bone can be palpated out of its normal position on the volar surface of the wrist.

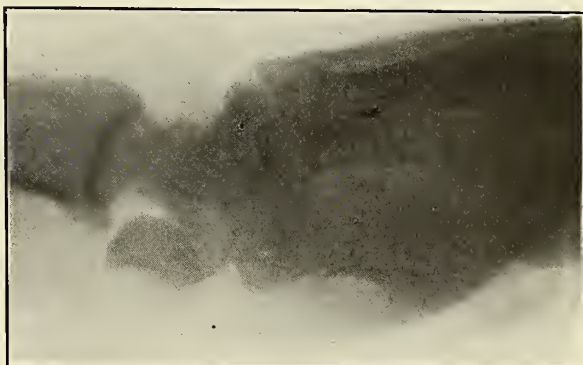
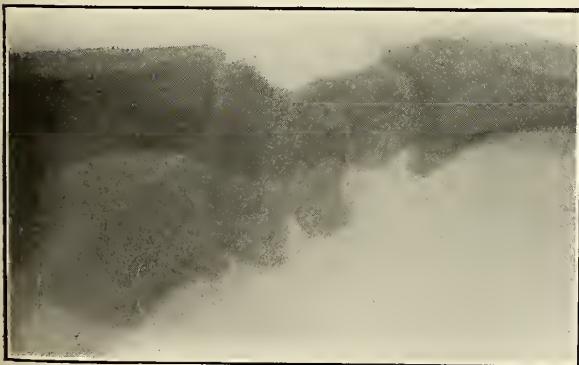
A report of the three cases follows:

CASE 1

Mrs. A. W., aged 53, was admitted to the Minneapolis General Hospital, October 7, 1921, with pain and swelling in the left wrist and hand. Two hours previous to her admission, while trimming a tree in her yard, she had fallen off a ladder, landing on the palmar surface of her left hand, bringing it into hyperextension. She was taken to the hospital by neighbors and admitted on our service. Past history was essentially negative.

On physical examination, we found a rather well developed and well nourished woman with swelling and deformity of her left wrist, which was painful to touch. There was a small laceration on the dorsal surface of her wrist, which was iodized and closed with two dermal sutures. The hand was dislocated laterally and dorsally at the wrist joint. Otherwise, the physical findings were negative.

A roentgenogram was taken, which showed a fracture of the styloid process of the radius and of the ulna with a dislocation of the wrist joint and of the semilunar bone. Under nitrous oxide oxygen anesthesia, the wrist joint was reduced, and another roentgenogram was ordered. The semilunar bone was still dislocated. On October 13, 1921, the patient was again anesthetized and the semilunar bone was reduced under the fluoroscope by using traction on the hand and at the same time hyperextending the hand



Case No. 2. Before and after reduction by the open method (volar incision).

and then flexing it while the assistant pressed his thumb against the bone on the volar side of the wrist distal to the end of the radius. An anterior splint was applied, keeping the hand in flexion to hold the bone in position. She was discharged October 20, 1921. Plates were taken before her discharge (see accompanying plates).

CASE 2.

Mr. J. S., aged 39, was admitted to the Minneapolis General Hospital, October 26, 1921, with pain and swelling in his right wrist which he had had for a week. On October 21, 1921, while cranking a Ford, the crank swung back on his right hand, bringing it into hyperextension, causing a deformity of his wrist with pain and swelling. Past history is practically negative.

On physical examination, we found a healthy laboring man, with pain and swelling in his right wrist. One of the carpal bones could be palpated beneath the skin on the volar side of the wrist just distal to the end of the radius. Otherwise, the physical examination revealed no injury.

A roentgenogram of the right wrist showed a dislocation of the semilunar bone towards the volar surface. On October 28, 1921, an attempt was made to reduce it under the fluoroscope with nitrous oxide oxygen anesthesia, using the same procedure as in the above case, but this was not successful. On October 29, 1921, he was taken to the operating room and given an anesthetic and the bone reduced by means of an open incision on the volar side of the wrist. On bringing the hand into hyperextension, the bone snapped back into place with considerable force. The incision was closed with catgut, and three silkworm sutures put in the skin wound. An anterior splint was put on, and two days later plates were taken, showing the bone in good position (see accompanying plates).



Case No. 3. Before excision of semilunar bone.

CASE 3

Mr. L. P., aged 22, was admitted to the Minneapolis General Hospital on Dr. F. A. Olson's service at 4:30 P. M., November 18, 1921. At about 3:00 o'clock that afternoon, while washing windows, he fell off a ladder and landed on his side on the cement sidewalk. He sustained a fracture of his left femur in the middle third and a dislocation of the semilunar bone in his left wrist.

Physical examination was negative except for the signs of a compound fracture of the middle third of the left femur and a swelling on the palmar side of the left wrist

with severe pain in the wrist. Dislocation of the semilunar bone was diagnosed and proven by a roentgenogram. On November 22, 1921, the semilunar bone was removed. In this case, this was the only thing that could be done because the bone was bulging subcutaneously and was dislocated so far that it could not be reduced even with an open operation. Plates taken afterwards show a good result. An anterior plaster splint was applied with the wrist in a cocked up position.

CONCLUSIONS

1. There are three distinct treatments for this condition:

- a. Reduction under fluoroscope and anesthetic.
- b. Reduction by open operation.
- c. Excision of the bone.

2. It is our opinion that most of these cases could be reduced by manipulation without operation if they came to the surgeon within the first twenty-four hours.

3. Forward dislocation of the semilunar absolutely prevents wrist flexion beyond ten degrees.

4. The principal danger of operation is injury to the median nerve, which should be located and carefully retracted before reduction is attempted.

5. Probably a great number of these dislocations, occurring in localities where an x-ray picture cannot be taken, go undiagnosed with resulting permanent limitation of motion and painful joint.

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UNUSUAL CASE OF BRAIN ABSCESS AND SINUS THROMBOSIS*

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This case is reported because of the intense interest which was aroused by the unusual features in the history, in the clinical course, and in the post-mortem findings. Only the essential and important points are reported. The history was taken by Dr. R. K. Dixon:

I. G., a white female clerk, age 20, was admitted on February 17, 1922, at 5:25 P. M.

Chief complaint: "Shooting pains in head" (indicated right frontal region), dull pains in back of head (posterior occipital region). Pain only on right side and apparently in the base of the skull. Slight pain behind the right ear.

Present illness: "Began about Christmas" (December 25, 1921). Patient had a severe cold and sore throat; about January 10, following, the right ear began to ache. The cold improved while the earache continued with intervals of improvement followed by periods of exacerbation. There was no discharge nor impairment of hearing. About February 1 there began headaches in the right frontal region. The pains were sharp, shooting and constant, and always confined to the right side. February 14 there was a dull ache in the right posterior occipital region. This pain steadily increased to the time of admission. On Thursday, February 16, in the afternoon, patient "saw double."

Past history: Measles, mumps, varicella, and scarlatina in childhood. There were no complications, no sequelæ, but complete recovery.

Family history: Essentially negative.

Physical examination: The patient was a well-developed, well-nourished, slender female, twenty years of age, apparently suffering considerable distress and complaining of a severe pain all over the right side of the head, most marked in the occipital region and posteriorly. There was tenderness over the right mastoid region.

Eyes: Pupils equal, regular, react to light. The right eye cannot be turned past the mid-line to the right. Diplopia is present only when patient looks to the right. Paralysis of the right external rectus muscle. Optic discs normal.

Nose: Clear, no discharge, no obstruction, no drainage from sinuses.

Mouth: Mucous membrane normal; tongue clear; teeth good; pharynx clear.

Ears: Left, normal. Membrana tympani normal. Right, showed a slight serous discharge in canal. Membrana tympani pale, grey, dull, with perforation posteriorly.

Neck: Normal.

Chest: Normal; no physical findings.

Abdomen: Negative.

Reflexes: All normal.

Temperature, 100° F.; pulse, 83; respiration, 16.

Diagnoses in receiving room: Otitis media chronic (right); brain abscess; beginning sinus thrombosis (right).

On February 18 the temperature was up to 101.4° F., pulse, 100. Leucocyte count, 12,550. The urine showed a few leucocytes, but was otherwise negative. The patient had slept fairly well; complained of pain in right ear and headache. Examined by the ophthalmologist, who reported the eye grounds negative. Also examined by the neurologist, who reported as follows: "Neurological examination negative, except for involvement of the right sixth cranial nerve. No Rhomberg, no rigidity, no Kernig; corneal reflexes normal and equal. Diagnosis?"

February 19. Condition about the same; still complaining of earache. X-ray of skull reported, "Mastoids are of small cell, rather infantile type. Left mastoid clear. Right mastoid shows absence of cells posteriorly to sinus; antrum cloudy. Ethmoid cells clear. Absence of frontal sinus shadow."

February 20. Comfortable night. Patient apathetic. On questioning still complains of headache on right side.

February 21. Condition same. Patient had epistaxis at 10 A. M. and at 3:30 P. M. Had emesis after noon nourishment. Eye grounds negative. Headache about the same. Pupils react sluggishly. Right external rectus paralysis the same. Blood Wassermann negative.

February 22. Complaints of intense headache, frontal and occipital. Patient was drowsy and nauseated all day. No localized tenderness except on pressure over the eyeballs. There was a slight rigidity of the neck. Kernig's sign negative.

February 23. Internist (in consultation). "Patient stuporous; rigidity of neck muscles; very suggestive Kernig. *Diagnosis:* Meningitis or possibly brain abscess." *Dental Consultation:* "Unrupted third right molar, otherwise condition good." *Ophthalmologist:* "Eyes negative."

February 24. Fairly comfortable night. Complaints of headache and nausea. Appears somewhat brighter. Ophthalmologist reports: "Eye grounds apparently negative, disc margins sharply defined, vessels not distended." Patient now showed definite signs of meningitis. Spinal puncture was done and 40 c.c. of cloudy fluid were obtained, under moderate pressure. The first 5 c.c. was slightly blood tinged. Cell count, 90; polymorphonuclears, 70; lymphocytes, 30; globulin plus; no organisms. Thirty c.c. of anti-meningococcus serum was given intraspinally.

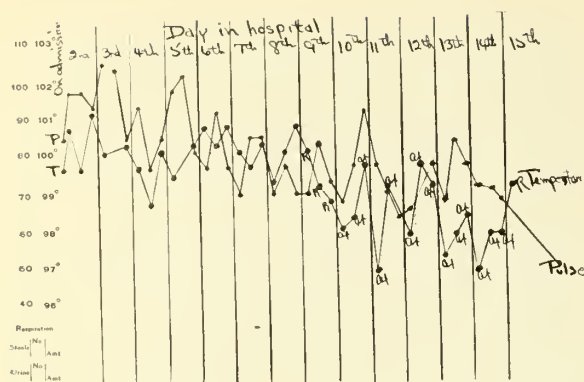
February 25. Patient complains of severe headache, is extremely restless and noisy. Had emesis several times during the day. There is a slight edema of the right upper eyelid. Spinal puncture was done. Thirty c.c. of fluid were withdrawn, under normal pressure, turbid, many pus cells, no organisms. Thirty c.c. of serum were given intraspinally.

February 26. Patient is becoming quite weak. Muscles are rigid. Body is in slight opisthotonos; pupils are fixed. Later the patient became unconscious and went into coma. Spinal fluid was under normal pressure and turbid with pus cells; no organisms were found. Thirty c.c. were removed and 30 c.c. of serum given. The edema of the right eye is more marked.

February 27. Patient responds dully to questions; screams out at times. Body still rigid. Right eye is markedly edematous and ecchymotic. Left eye is slightly

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edematous. Spinal fluid was under normal pressure. Forty c.c. of turbid fluid were removed, containing many pus cells, but no organisms. Culture of the spinal fluid of February 26 reported positive for staphylococcus.

February 28. Condition about the same, except that the stupor is more marked.

March 1. Patient is more quiet. Spinal fluid full of pus cells; normal pressure; 30 c.c. removed; 20 c.c. serum given intraspinally.

March 2. Patient is very quiet. Spinal fluid under normal pressure and full of pus cells; 25 c.c. serum given intraspinally.

March 3. Patient is extremely dull. Body rigid, in slight opisthotonos. Pupils dilated and fixed, equal and regular. Reflexes not obtainable. Patient died at 9:15 A. M. Autopsy was performed.

Following is the autopsy report as submitted by Dr. G. B. Kramer, Resident Pathologist to the City & County Hospital, St. Paul, Minnesota:

Autopsy was performed March 3, 1922, at 9:30 A. M.

External appearance: Body is that of a well-developed, well-nourished white young female, 171 cm. long. Rigor mortis not yet present and post-mortem lividity confined to the back. Pupils equal and corneæ clear.

Peritoneal cavity: On opening the abdominal cavity nothing unusual is noted in the position of the abdominal organs, or in the boundaries of the diaphragm.

Pleural cavities: Right and left are free from adhesions.

Pericardium: Measures 10.5 x 11 cm. and contains 28 c.c. of clear yellow fluid.

Heart: Muscle is red in color. Consistency is good, all valves are normal and heart weighs 228 grams.

Lungs: Left is crepitant, pink and slightly mottled black. On section the lung is somewhat congested, and there is a small abscess along the anterior border of the lower lobe. Abscess measures 2.5 cm. in width. Weight is 269 grams. Right is same as left and weighs 304 grams.

Spleen: Soft in consistency. Surface is bluish red. On section the Malpighian corpuscles are prominent and in places congested. Measures 14 x 6 x 4.5 and weighs 141 grams.

Liver: Slightly larger than usual and measures 24 x 16 x 8. It is a dark brownish red color. On section it appears cloudy and swollen and weight is 1.644 grams.

Gall bladder: Normal.

Stomach: Slightly congested in places.

Pancreas and intestines: Normal.

Adrenals: Normal.

Kidneys: Left.—Capsule strips easily. Surface is dull red, smooth, and on section it appears cloudy and swollen and weight is 179 grams. Right is identical with left and weighs 178 grams.

Bladder: Contains a small amount of urine.

Uterus: Is of usual size and appearance.

Ovaries: Normal in size.

Fallopian tubes: Show nothing unusual.

Calvarium: Normal thickness. There is no necrosis or erosion of bone at base of skull.

Meninges: Congested over the right and left temporal regions.

Brain: Left posterior cerebellar hemisphere. The cerebellum and the base of the brain is filled with muco-purulent yellow pus. The brain in the left temporo-frontal region is scooped, soft, necrotic and filled with pus. The softened area measures 4 x 4 cm. There is a hemorrhage in the left cerebellar lobe. The hemorrhage extending towards the left superior peduncle. There is an abscess 2 x 3 cm. in the left cerebellar lobe and there is an opening from the surface extending into the abscess. Cultures of this pus showed staphylococcus.

Sinuses: The right and left cavernous sinus show septic thrombi. The left and right superior and inferior petrosal sinuses and the circular and transverse sinuses are filled with pus. The right drum is perforated. The margin of the perforated drum is thickened and raggedy. The left ear drum is edematous. There is no pus present at, or around, the drum.

Anatomical diagnosis: 1. Acute localized meningitis. 2. Focal brain necrosis. 3. Cerebellar abscess. 4. Septic thrombosis of sinuses at base. 5. Chronic otitis media (right). 6. Acute toxic nephritis. 7. Acute toxic hepatitis. 8. Metastatic abscess of lung (left). 9. Acute parenchymatous splenitis. 10. Slight congestion of stomach.

COMMENT

The diagnosis of brain abscess and beginning sinus thrombosis, as made in the receiving room, were, of course, somewhat far-fetched. The subsequent course of events substantiated the diagnosis. The treatment of this case was purely symptomatic, until the development of the meningitis. There was at no time a definite indication for surgical intervention. The internists, surgeons, oto-laryngologists and the neurologists, were all agreed that at no time were there localizing symptoms indicative of radical treatment. The meningitis was treated with antimeningococcic serum, because at first no organisms were found, and the possibility of an epidemic meningitis was considered. With the post-mortem findings there can be little doubt but that the infection was primary in the right ear.

A CASE HISTORY OF FRACTURED PELVIS

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The following case is especially interesting, not only from the fact that the injury was so extensive, but from the number and variety of complications which arose and which are the things which add zest to the practice of medicine and surgery.

If every case followed a cut and dried course, I venture to say that few of us would stay in the game very long. It is the excitement and expectancy of something new always coming up in our daily work that really makes it worth while and keeps each one of us alive to our better selves.

Case history: H. V., married, aged 26, farmer, of German descent, with no past history of any consequence, had always been healthy and a hard worker.

On August 31 last, while riding a horse, he reined it in sharply and the horse reared up, fell over backward and landed squarely across the abdomen and pelvis of the rider. He suffered severe pain over the lower abdomen and back, being unable to get up, and the pain was so severe on attempting to move the legs that this was practically impossible.

A short time later he found the urine bloody. He was nauseated but did not vomit nor did he lose consciousness at any time. Defecation showed no blood.

Urination became increasingly more and more difficult until it completely stopped on the morning of September 3, when he was admitted to the hospital and came under our care. On examination we found no deformity or shortening of the legs though attempts to move them caused great pain, and jarring on the bottoms of the feet with the limbs extended was also painful. Pressure on the pelvic bones was not especially painful but a twisting of these bones caused excruciating pain. He was very tender over the bladder and dullness extended a considerable distance above the pubis. Temperature was 99.4 and pulse 102.

On catheterization we removed 22 ounces of very thick bloody urine, which relieved him to a considerable extent. The bladder was irrigated with boracic acid solution, which returned with difficulty, showing that the catheter was being plugged by blood clots and the return solution did not clear at any time.

The bowels not having moved for two days he was given two ounces of castor oil, which acted at five-thirty the same evening normally, and showed nothing out of the way.

He slept at intervals during the day. During the evening an orderly passed a catheter easily again but there was no return. I called and introduced the catheter easily and after no flow introduced a little boracic acid solution, which started a free flow of bloody urine.

On September 4, morning temperature 101, pulse 93, general condition the same. During the night he had been given one-half grain of codein hypodermically for pain.

He passed an easy day with an evening temperature of 101.2, pulse 102.

September 5, A. M. temperature 99.4, pulse 96. Urine, passed partly voluntarily and partly through catheter, was still very bloody. Soapsuds enema gave good results. Evening temperature 101.2, pulse 93. A light cathartic was given this evening and during the night he was given codein twice for pain.

During this time he had been on light diet and taking a fair amount.

September 6. A. M. temperature 100, pulse 106. He complained of pain in the left lower abdomen, which was aggravated by application of heat. This evening he had a temperature of 99.6, pulse 122, and during the night he had severe pain and was given one-quarter grain of morphine. Pulse during the night remained at about 120. The bladder was irrigated twice daily with boracic acid but showed no signs of clearing.

September 7. Temperature 99, pulse 110. Abdomen distended but not rigid and no vomiting. A rectal tube was inserted and a large amount of gas passed, giving almost complete relief. Evening temperature 101.4, pulse 104. During the night he was very restless and pain around the bladder necessitated morphin twice.

September 8. Patient rested fairly well and voided urine normally, but it was still bloody but clearing considerably. Temperature 99.6 but pulse 136 and very weak and thready. Abdomen distended but not tender. Soap enema freed a large amount of gas and relieved his pain, but had no effect on the pulse. At noon the temperature was 98.4, pulse 132 and he was perspiring freely. He was given a hypo of camphorated oil 1 c.c. with no effect.

At three P. M. he was given morphin, gr. $\frac{1}{4}$, with atropin gr. $\frac{1}{150}$ and under novocain one-fourth per cent an opening was made down onto the bladder. The space just above the pubis was filled with fluid and blood clot, which was cleaned out and an opening found in the bladder made by a piece of bone from the posterior side of the pubis, which had been driven into the bladder, making a rent about one inch long. The bladder was filled with blood clots, which were evacuated, and then another laceration about one and a half inches long in the posterior wall of the bladder was found just above the trigone, with another piece of bone, about the size of a quarter, very firmly attached to the tissues over the hollow of the sacrum. No opening into the abdominal cavity was found. Owing to the condition of the patient and the piece of bone being very adherent, it was left in place and the bladder connected with an intermittent syphon as in a suprapubic prostatectomy.

He passed a very poor night but the morning found a temperature of 100.4 and a pulse of 108. Calomel, followed by a light saline and a soapsuds enema cleared the bowels well and by evening the temperature was 100.2, pulse 96.

He suffered very little for some days after the operation and slept fairly well, also taking a fair amount of liquid nourishment, about the only medication being a little urotripin.

September 14 his temperature began to rise, accompanied by a swelling in each parotid gland, which continued to get worse for the next two days, with the temperature going to 103 and pulse to 108. The abdominal condition was satis-



factory. There was no fluctuation or redness in the glands at any time. Glands were coated with a mixture of equal parts of 10 per cent ichthylol and belladonna ointment. The only other symptom aside from pain in the glands was a little vomiting.

After the first twenty-four hours the temperature gradually fell till it reached normal on September 21. By this time the condition was that of extreme emaciation and what is often referred to as a typhoid condition. He was put on Elixir I. Q. S. and hypodermics of strychnin, gr. $\frac{1}{30}$, four times a day for the next week with concentrated liquid foods and a little panopeptone and liquid peptoids.

During the following week he developed a broncho-pneumonia just to add to his pleasures.

On October 1, due to the emaciation, which was extreme, and to the impossibility of keeping him perfectly dry, a large slough formed over the sacrum, taking practically all the soft tissues down to the sacrum. Boracic acid, zinc stearate, etc., were tried on this but gave no relief, so that we changed to Dakin's solution, which stopped the extension of the slough and the pus began to clean up.

For some time we had also been using Dakin's solution for bladder irrigation and had had very little pus from it.

During the first week in October he vomited practically everything and would only retain a few teaspoonfuls of buttermilk, albumen-water, etc., while his temperature varied from 96.5 to 97.5 with a pulse of 100 to 120.

His principal complaint during this time was pain in the abdomen with a desire for defecation though he had involuntary movements every day; this desire we were unable to relieve.

About the 10th of October he began to gradually pick up a little and the temperature returned to normal though he was very restless and slept very little.

On October 15 the temperature gradually began to rise again with the developing of an abscess in the abdominal wall to the left of the incision. This drained through the edge of the incision but the temperature did not fall, but rather went higher and became the septic type, 103 at

night and 99 in the morning. This was accompanied by a swelling of the left thigh though with little induration and no redness.

The patient complained on urination of a gurgling sensation in the thigh and soon on tapping we could get a succussion sound and by pressure on the thigh pus was expelled from the meatus. The thigh was incised at about the middle, over the adductor magnus, and a moderate amount of pus evacuated; but when he came to urinate about half of the urine came through the wound in the thigh.

The temperature now gradually dropped to 99 or 100 and he began to pick up rapidly though there was no cessation of the discharge in the thigh.

The hospital x-ray apparatus had been out of order and we did not feel that his condition had justified our taking him to the office for this work till November 28, when I should estimate that he had gained about twenty-five pounds over his low point. We then took him down and filled the sinus in the thigh with bismuth paste when the x-ray showed the cavity extending up to just in front of the prostate, where there was evidently an opening into the urethra, which accounted for the discharge of urine only on urination, it being outside the sphincter.

The pelvis was also rayed from two angles, one picture showing a longitudinal fracture in the sacrum and the other a fracture of the ascending ramus of the left ischium. There is also an osteomyelitis of the wing of the right ilium. I should have mentioned that he had been complaining of pain and tenderness over the right ilio-sacral synchondrosis and over the rim of the ilium for the last two weeks though there was no redness but a little puffing.

The bismuth paste plugged the urinary fistula and it has apparently healed though there is still a slight suppuration from the opening in the thigh.

On December 5 we made an opening over the rim of the right ilium and found the periosteum raised up from the bone on the inner and outer side for an area of about two inches square, the space being filled with a soft granulation tissue and the bone soft and oily on pressure of the rongeur. The soft bone was removed till we reached bleeding bone and the periosteum replaced, the wound being partially closed and drained. Healing is taking place nicely here.

The temperature gradually became normal and he was allowed to go home on December 19 to report occasionally on the condition of the thigh and ilium.

Now with the chance for extravasation of the urine that there was in this case why did he go nine days without showing any great signs of sepsis and why did the pulse become so suddenly weakened?

Did the devitalized tissues hold and prevent extravasation till a day or two before the collapse?

Then the parotitis, was it mumps or metastatic infection from the bladder? The period of twelve days in the hospital with no other cases around does not preclude the former. On the other hand no other cases developed from this.

Again, how was the ruptured urethra produced in that area and how did the fistula come to open half way down the thigh instead of the urine following up Colles' fascia over the abdomen or producing an abscess in the perineum?

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EDITORIAL

The Rockefeller Foundation

The career of Dr. George E. Vincent, recently president of the University of Minnesota and now president of the Rockefeller Foundation, is of particular interest to the many Minnesotans who have come in touch with his brilliant mind. Few realize the literally world-wide and almost unbelievable magnitude of the humanitarian organization he supervises.

An expression of the activities of the Foundation in dollars and cents gives an idea of the extent of the resources and disbursements of this organization. Its working capital amounts to some \$174,511,957 and its physical property is valued at \$8,666,813. From the time the Foundation was chartered in 1913 it has disbursed, appropriated or pledged a total of \$84,301,394. Last year its disbursements totaled \$7,444,565, while its administration expenses amounted to only \$185,792. We wonder how much it would cost the government to administer such a sum.

An accurate valuation of this institution in dollars and cents is impossible, for its contribution to the world at large expressed in money value is doubtless several times this amount through the

prevention of economic loss from human disease; for the institution is primarily one concerned in the prevention of disease and the furtherance of medical science and therefore of very particular interest to the profession.

Enormous strides have been made in preventive medicine and the subject is well summarized in Dr. Vincent's report as follows:

"the presence of smallpox is now a disgrace to any civilized community or country; cholera and plague have disappeared from the leading nations; typhoid fever has been enormously reduced; malaria and hookworm disease are giving ground; yellow fever is being narrowly restricted; typhus is practically unknown among a cleanly people; the fear of diphtheria has been largely allayed. Such victories as these, together with advances in general sanitation, higher living standards, more attention to individual health habits, have resulted in steadily falling death rates in all the more progressive countries.

"But it is too early to feel complacent. Only a beginning has been made. Many diseases still baffle the health authorities. Whole regions have been almost untouched. Even the most advanced communities fall far short of what might be attained. The average individual remains relatively ignorant and negligent of sanitary science and of personal hygiene. Almost all physicians are still too exclusively concerned with the individual aspect of disease."

It is true that we as physicians are prone to limit ourselves to the view of our practice as made up solely of individual cases. The human mechanism is so variable that this individual treatment is necessary. And yet when we come to consider the very limited scope of our ability to treat after our very elaborate diagnostic investigation we are forced to admit the much greater value of preventive medicine.

Medical men as a whole have failed to see the vision of preventive medicine. Preventive medicine heretofore has been typified by Health Departments and these have been so much under the influence of politics and so underpaid that medical men have been in the habit of looking down on this form of preventive medicine. The uncertainty of the job deters the average physician from this line of work.

One of the important activities of the Foundation has been the contribution last year of three-quarters of a million dollars to the School of Hygiene and Public Health of Johns Hopkins University. Harvard has been pledged two million for a similar school. This means that the country is to be supplied with trained public health specialists and we venture to predict that preventive medicine is coming into its own.

The New Child Hygiene Division of the State Board of Health: Its Relation to the Physicians of Minnesota

The accumulation of evidence showing that there is a very pleasing and vital need for the "promotion of the welfare and hygiene of Maternity and Infancy" has led to the passage of a Federal Act for that purpose—the Sheppard-Towner Act, approved November 23, 1921.

The beginnings of the agitation for improvement in the hygiene of maternity and infancy were long ago. Progress was slow, for it had to contend with an inertia, a fatalistic conception that Providence, in the guise of a midwife, had taken the field of obstetrics for its own. Gradually societies and organizations were formed, inspired by the spectacle of maternal suffering and death and of an incredible infant mortality. They sought to make others aware of the almost unbelievable situation and they worked hard to gather material which might help in their search for the cause, ultimate effect and cure. During the past ten years these organizations have grown greatly, until at present there are some eighty-three national organizations engaged in whole or in part in some phase of the problem. They have conducted numerous demonstrations, inspired a large amount of legislation and have spread their propaganda continually in every direction. Then there are state and municipal, county and district organizations, so that the accumulation of thought and effort should be tremendous and overwhelming. The personnel of these organizations includes thousands of individuals trained in some phase of infant, child and maternal hygiene and they enlist the sympathy and co-operation of many others.

What is the reason for such tremendous and widespread activity? What is to be done and how?

The reason for all this work is to be found in the conviction in the minds of an increasing number of men and women that babies and children by the thousand die unnecessarily or advance towards the duties and responsibilities of a United States citizen and potential parent with an unnecessary handicap of deformity or poor health; and that maternity, at present, holds too great a threat of death or disability. They know that this loss can, to a large extent, be prevented and they hope to prevent it by a variety of means which may be summed up in the word *education*.

This education is to be spread by every vehicle of popular propaganda. It has for its ultimate object the creation of a universal conviction of the reasonableness of the proposition that women ought not to suffer a preventable death in bringing children into the world; that, having borne them, they ought not to lose them through disease, mostly preventable, and that the babies, themselves, ought to receive no unnecessary burden of ill-health to handicap them in their coming years.

This popular education has already begun to foster a demand for purely preventive medicine, particularly in pediatrics and obstetrics, to the satisfaction of which the physician must give an increasing amount of his consideration. The proper satisfaction of this increasing demand by the family physician, the man who, in the final analysis, will most often be the one who must give it, will do more perhaps than any single other factor in fulfilling the aims and hopes of the Child Welfare Movement in America. To him should come the forward looking ones with their anticipations and the anxious ones with their misgivings and fears and he must deal with the future and potential of sickness rather than with the present and actual. And since a pressing and active curiosity is the beginning of knowledge, progress may be expected in direct ratio as this curiosity is satisfied.

The medical profession must become conscious, then, that there is growing among the millions of people in our country in response to this steady and all-pervading propaganda a demand for a type of medical attention that is as yet not generally practiced. The people are beginning to feel that along certain lines they have been groping in darkness. They are beginning to inquire for more light, since they are being told continually that there is more light. The man to give this light is the average practitioner, wherever he may be, in the country, town or city. Should he fail to respond through the channels which are open to him with sympathy and with understanding to this awakening health consciousness of the people, then they must seek elsewhere for guidance. And every physician knows how even now false leaders, some lay and some with pseudo-science, stand ready and anxious to assume a leadership which may be taken safely only by those men whom the state has trained for such leadership.

The Division of Child Hygiene hopes to work with the physicians of the state in this campaign of education. Dr. J. Witridge Williams says that a

physician is not a servant, he is a teacher. Our obligations to society will never be completely fulfilled until we teach our communities how to avoid disease as well as treat for disease which, sometimes, of course, will come to everyone.

—E. C. H.

Mal de Mer

It may be recorded somewhere, the surprise that first appeared on prehistoric man's face when, in his tree dugout, he first noted the curious cerulean hue in his wife's face as he paddled along, but the reference is not now available. In any case, much time has elapsed, and many observers have had a chance to venture either etiological fundaments or therapeutic panacea. So grief is said to reduce all mankind to a common level, but it cannot compete in that expedient with some seasickness. This level is not only physical, but it is moral and spiritual. Great naval commanders must have early developed means of relief; I cannot conceive anyone in *command* embarrassed by an inward obsession that harbors no rivals.

There is a common assumption that children do "not get seasick." This, like many similar dicta, is wrong. Yesterday I saw what was formerly a ruddy-faced youth wrapped up in a blanket, and his sorrowful countenance and pale face betokened a striking terminal nephritis or pernicious anemia. Yet, he was a luminous planet compared with a naturally tired looking teacher, a bit asthenic at best, fired with an ambition to live and see, far out of keeping with her physical endowment. Let us leave her alone to her sorrow and happiness. It is awful to be seasick, but a fine topic later for home conversation—anyway, she is not in shock. How much of mal de mer is mental?

Several of the lounging rooms in this boat are equipped with a curious type of fireplace: artificial coals repose in the cheerful looking grate, as we often see in gas connections. But the fine, stimulating glow behind is not from a flame but from especially devised electric bulbs. In addition, a sort of fan on the inside rotates, and, sitting back, a shadow is seen above the "flaming mass" exactly as if heat waves were rising against the usual paneling of the grate overhead. Few approach there on these chill days in the North Atlantic, without envying those "before the fire." Yet, as the fog and dampness deepened, the camouflage didn't work, and gradually the cold hands were brought in actual contact with the "flaming coals," only to find them

a little colder, if anything, than anything else. Now, let us reverse this set of conditions, and on a warm day the grates are shunned, and if one should come in after a brisk walk, such a "stiffing situation" would be unendurable.

If you have followed me you will sense why it is that the casual stagger of a man on terra firma would lead those about him to watch him with the very greatest interest to attempt to decipher a possible lead as to where he got it—animation emanates. But let the same man casually do the same on shipboard, even in a situation of calm and even keel, and a fair number will adopt a look of the most extreme disgust, cast furtive glances toward the rail, and despise him as a plague-stricken intruder.

Distant voices at times lend a charm, and even a distant brawl excites the imagination, but let some overwrought occupant of an adjacent berth let out just one gastric howl (the wolf-like call of the diaphragm confused and obsessed), and the whole pack responds with a chorus of answers where previously all was silence and tranquillity. Wolves only gather in packs for offense—and seasick folk have no powers of offense—hence, they also steal off into the silent places (usually their bunks), where the lair as of others reduced to primitive conditions takes on the outward evidences of neglect, including the characteristic aroma of gastric juice.

—E. L. T.

OBITUARY

DR. JOSEPH A. GATES

Dr. Joseph A. Gates of Kenyon, one of the most prominent men in his community and county as well as in the state of Minnesota, was instantly killed the morning of June 15, when his automobile, in which he was driving alone to answer a call, was struck by a Chicago Great Western passenger train on a crossing two miles south of Kenyon.

Dr. Gates was born September 11, 1870, at Oronoco, Minnesota, the seventh son of Elnathan and Jane Waldron Gates. He was graduated from the Rochester, Minnesota, High School and decided to make medicine his life work at that time. His medical course was obtained at the expense of much real sacrifice and hard work. He graduated in 1895 from the University of Minnesota medical school, being president of his class and assistant to the professor of chemistry.

On June 10, 1898, he was married to Jennie A. Clark of Rochester, who, with their six children, survives Dr. Gates.

The practice of medicine was taken up at Kenyon imme-

diately upon his graduation and Dr. Gates had since established himself as a leader in community affairs in general. In 1898 he was elected a member of the board of education, later clerk and president, remaining on the board until his death. In 1901, Dr. Gates founded the Kenyon telephone exchange. He was also very active in working for the establishment of the Tuberculosis Sanatorium at Mineral Springs and was a director of the Citizens State Bank of Kenyon.

It was not only in Kenyon that Dr. Gates was active in business and political life. He was a member of the state legislature from 1904 to 1908 and was for years a member of the State Central Committee for the Republican party.

During the war, Dr. Gates not only sent his two sons into the service, but also enlisted himself in 1918, serving as captain in the Medical Division of the U. S. Army at Fort Riley, Kansas, Camp Travis, Texas, and Camp Meade, Maryland, as commander of the 52nd ambulance unit. He was first vice commander of the State American Legion at the time of his death.

Dr. Gates was a member of the Blue Lodge, Royal Arch Chapter, and commander of the Masonic Order and a Mystic Shriner of the Osman Temple, St. Paul. He also belonged to the Elks, I. O. O. F., M. W. A., A. O. U. W., Eastern Star and the Degree of Honor.

The esteem and good will in which he was held in his own community marked the respect of those who came to know him elsewhere as well. It is felt that his is an irreparable loss to the country in which he lived.

DR. WILLIAM P. O'MALLEY

Dr. William P. O'Malley died at Shakopee, Minnesota, Sunday, July 9, 1922, as a result of injuries he sustained in an automobile collision near that city while driving to his home in St. Paul from Prior Lake.

Dr. O'Malley was born at Westport, near Madison, Wisconsin, in 1874. He graduated from St. Thomas College in 1898. The same year he entered the medical college of the University of Minnesota, from which he was graduated in 1902. The year following he served his internship at St. Mary's Hospital in Milwaukee. From there he went to Elkhorn, Wisconsin, and began the practice of medicine. He continued there until 1906, when he removed to St. Paul, Minnesota. From that time he was actively engaged in general practice until he entered the military service of the United States in July, 1917.

He was commissioned a First Lieutenant in the Medical Corps and entered the medical officers' training camp at Fort Riley, Kansas. He was assigned to the 313th Sanitary Train, 88th Division, in September, 1917. He was promoted to Captain in April, 1918, and went to France with his unit in August of the same year. He saw active service on two fronts, the Alsace and Meuse-Argonne. After the armistice he was one of the medical officers assigned for special study at Toulouse University.

Upon his return to the United States, Dr. O'Malley did post-graduate work in urology at Johns Hopkins University. Since his return to St. Paul in March, 1920, he limited his practice to that specialty.

Dr. O'Malley as a physician and as a citizen was beloved of all who knew him. He was ever frank, generous and

sincere, brave and sympathetic. Loyalty was a fetish with him. Numerous friends mourn his untimely death.

DR. JAMES N. METCALF

Dr. James N. Metcalf of Monticello, while returning from the country, where he had been making a professional call, was fatally injured at the Buffalo road crossing of the Great Northern Railway, Sunday, February 12, 1922, at about 1:20 p. m., when the engine of the train hit his team as it was crossing the track. Dr. Metcalf was placed on the train and taken to St. Raphael's Hospital at St. Cloud, where he died soon after reaching the hospital. Dr. Metcalf had lived in Monticello for more than 15 years, coming there in August, 1906.

James Natrass Metcalf was born at Benton, Wisconsin, January 20, 1881. With his parents he moved to Dubuque, Iowa, in 1893 and after graduating from the high school of that city he moved to Minneapolis and entered the University of Minnesota in 1899, taking up the medical course, from which he was graduated in 1905. After one year in hospital service in South Dakota, he came to Monticello.

On October 9, 1907, he married Miss Mildred Brunskill of LeMars, Iowa. She, with their two children, Kenneth and Maxine, his parents, James and Margaret Metcalf of Minneapolis, three brothers, Thomas of Dodgeville, Wis., Leonard of New London, and Clinton of Minneapolis, and one sister, Mrs. William Robson of Cuba, Wis., survive him.

DR. SAMUEL F. HANCE

Dr. Samuel F. Hance, a pioneer member of the medical profession in Minneapolis, died last month at the home of his daughter, Mrs. Charles J. Thistlewaite, Fairport, N. Y., at the age of 97 years. Dr. Hance left Minneapolis in 1902 to live with his daughter, after a practice of thirty years in that city.

He was born in Marion, Ohio, July 1, 1825, and received his medical degree from Albany Medical College in 1855. Dr. Hance began the practice of medicine in Buffalo, N. Y., and later went to Aurora, Illinois, where he remained for fifteen years. In July, 1862, he enlisted in the 89th Illinois Volunteers as a surgeon with the rank of major, and served until April, 1863.

He came to Minneapolis from Illinois in 1873 and continued his practice until the time of his retirement.

Dr. H. H. Haskins, 78 years of age, who practiced medicine for thirty-three years at Canton, Minn., died at his home in Cassadaga, Florida, May 9, 1922.

Dr. Conrad W. Wilkowske of Chippewa Falls, Wis., formerly of Faribault, Minn., was drowned while fishing in Lake Bob, near his home, June 17. Dr. Wilkowske practiced medicine in Faribault for nearly six years after graduating from the school of medicine at the University of Minnesota. He then went abroad to Vienna to specialize in eye, ear, nose and throat diseases. From there he went to Chippewa Falls to practice his specialty. He was 48 years of age.

Dr. Charles Van Cappellen of St. Paul died at his home in January at the age of 66 years.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

MINNESOTA STATE MEDICAL ASSOCIATION MEETING

The next meeting of the State Medical Association will be held in Minneapolis in the latter part of October. The President, Dr. J. Frank Corbett, has practically completed the selection of the personnel of the various committees and the decision has been made to hold the meetings at the University. This will provide a meeting place conveniently accessible to both Minneapolis and St. Paul and make it possible to have the various halls and exhibits close together. The Dean and Faculty of the Medical School, through Dr. Arthur Strachauer, Chairman of the Campus Committee, have promised their active co-operation even to the extent of dismissing the classes of the school on the days of the meetings.

The program is being arranged with a view to being of particularly practical interest to the men on the "firing line" of clinical medicine. The general arrangements are in charge of a committee headed by Dr. Edwin L. Gardner. Dr. Stanley R. Maxeiner is in charge of the exhibits, both scientific and commercial, and is planning on an unusually large amount of material.

Details of the entertainment features will be announced at the time of publication of the complete program.

WABASHA COUNTY MEDICAL SOCIETY

The annual meeting of the Wabasha County Medical Society was held at Wabasha Thursday, July 6, with an attendance of thirty.

Papers presented at the meeting included:

The Modern Conception of Heart Disease—President's Address—Dr. Hugo Branyan, Wabasha.

The Heart in Thyroid Toxemia—Dr. John T. Bowers, Lake City. (Read by title.)

Myodegeneration and Heart Disease of Middle Age—Dr. George E. Fahr, Minneapolis, Assistant Professor in Medicine, University of Minnesota.

The Functional Heart Tests in Diagnosis and Prognosis—Dr. D. S. Fleischhauer, Wabasha.

The Present Status of Digitalis Therapy—Dr. E. H. Bayley, Lake City.

Officers elected for the coming year included: President, Dr. L. F. Sutton, Mazeppa; vice president, Dr. G. Schmidt, Lake City; secretary-treasurer, Dr. W. F. Wilson, Lake City; delegate, Dr. H. E. Bowers, Lake City; alternate, Dr. W. H. Replogle, Wabasha; censor for three years, Dr. A. A. Rankin, Zumbro Falls.

A dinner was served at the Buena Vista Sanatorium through the courtesy of the Tuberculosis Commission of Wabasha and Winona counties.

It was voted to send ten dollars out of the funds of the society to the committee for "American Medical Aid in Russia."

REDWOOD-BROWN COUNTY MEDICAL SOCIETY

The Redwood-Brown County Medical Society held its annual meeting in Sleepy Eye State Park on the afternoon

of June 15. At this meeting the following officers were elected for the ensuing year:

President—Dr. Earl Jamieson, Walnut Grove.

Vice President—Dr. F. J. Pelant, New Ulm.

Secretary-Treasurer—Dr. Wm. A. Meierding, Springfield.

Delegate to State Meeting—Dr. J. C. Rothenburg, Springfield.

Alternate to State Meeting—Dr. Theo. Hammermeister, New Ulm.

Censor for Three Years—Dr. Geo. B. Weiser, New Ulm.

Drs. Rothenburg and Hammermeister were appointed as a legislative committee to act with the state legislative committee. After the business session, the doctors and their wives enjoyed a social outing and picnic lunch in the park.

CENTRAL MINNESOTA MEDICAL ASSOCIATION

The summer meeting of the Central Minnesota Medical Association was held at Litchfield, June 13. Business as well as social sessions were held at the Robertson cottages at Lake Ripley.

The presentation of five papers composed the program, which included the following:

Milk and Its Relation to Public Health—Dr. George E. Sherwood, Kimball.

The Limits of Local and Regional Anesthesia in Surgery—Dr. Richard R. Cranmer, Minneapolis.

The Treatment of Menorrhagia with Radium—Dr. F. T. Brigham, Watkins.

X-Ray Diagnosis of Some Gastro-Intestinal Diseases—Dr. A. F. Branton, Willmar.

Gastric Symptoms Not Due to Gastric Diseases—Dr. R. E. Anderson, Willmar.

Visiting ladies at the convention were entertained by the wives of the Litchfield physicians and in the evening a banquet was served to all delegates.

MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE RAILWAY SURGICAL ASSOCIATION

The fifteenth annual meeting of the Minneapolis, St. Paul & Sault Ste. Marie Railway Surgical Association will be held at Minot, North Dakota, September 25 and 26.

OF GENERAL INTEREST

Dr. J. E. Arnold, formerly of Eveleth, has taken up his practice in Vernon Center.

Dr. F. H. Neher and Miss Cecelia Kilbane, both of St. Paul, were married July 12, 1922.

Dr. C. W. Paulson and family of North Branch are taking a vacation trip to the Pacific coast.

Dr. G. N. Ruhberg of the City and County Hospital has located at 821 Lowry Building, St. Paul.

Dr. E. V. Mastin, who received the degree of M. S. in Surgery in June, will locate in St. Louis.

Dr. J. T. Asbury of Rochester has located for the practice of medicine at Stewartville, Minnesota.

Dr. Carr of Boston has become associated in practice with Dr. E. P. Hawkins at Montrose, Minnesota.

Dr. J. W. Ross, whose fellowship in the Mayo Foundation expired July 1, has located at Toronto, Canada.

Dr. J. J. Stratte, formerly of Minneapolis, has become associated with Dr. Arthur W. Shaleen at Hallock, Minnesota.

Dr. F. C. Lorenzen, formerly of Elgin, N. D., has located in Richfield and has opened his offices at 5560 Nicollet Avenue.

Dr. and Mrs. H. E. Binet of Grand Rapids have returned from a three weeks' motor trip through the East and Canada.

The ceremony of presentation to Dr. L. B. Wilson of a Distinguished Service Medal took place at Fort Snelling June 26.

Dr. and Mrs. E. J. Tiedemann and daughter Helen of Adrian have returned from a camping and fishing trip in Wisconsin.

Drs. Olaf Sand and Hans Haugen of the Fargo clinic are spending their vacations at Fair Hills, Pelican Lake, Minnesota.

Dr. M. E. Withrow of International Falls is attending to his practice again after several weeks in the hospital at Brainerd.

Dr. H. M. Johnson of Dawson has visited several clinics the past month, including the Fargo and Bismarck clinics in North Dakota.

Dr. V. P. Hauser of the City and County Hospital has become associated with Dr. F. C. Schuldt in the Lowry Building, St. Paul.

Dr. and Mrs. James Blake and their children of Hopkins have returned from a six weeks' automobile trip through the East and Canada.

Dr. and Mrs. Frank A. Allen of Ironton have returned from an automobile trip to Grand Marais, Port Arthur and other Canadian points.

Dr. G. J. Furreira, formerly of Iowa, has located at Aurora and will be associated in his practice with Dr. C. W. Bray of Biwabik.

Miss Virginia Cole, daughter of Dr. and Mrs. H. B. Cole of Redwood Falls, was an honor graduate at Northwestern University this spring.

Dr. and Mrs. William A. Meierding of Springfield spent a week the latter part of June camping and touring through the northern part of Minnesota.

Dr. O. G. Engstrand of Brownton, who has been ill with pneumonia at the Swedish Hospital, Minneapolis, has been reported as slowly improving.

Dr. F. H. Stangl of Chicago has moved to St. Cloud, where he has entered partnership with his brother, Dr. P. E. Stangl, in the practice of medicine.

Dr. P. Blanco has left the Mayo Clinic, having completed his fellowship, and has gone to Buffalo to work as orthopedic surgeon in Dr. Butsch's Clinic.

Dr. L. T. Murphy, who has completed his fellowship in the Mayo Foundation, has left the clinic to begin practice in the Nicollet Clinic, Minneapolis, Minnesota.

Dr. W. G. Walters, who has been located at Pine City for the past three years, has moved to the northern part of the state to engage in contract medicine.

Announcement has been made that Dr. M. A. Trow, who has been practicing in Dakota the past thirty-eight years, will establish his medical practice at Chatfield.

Dr. Walter Stilwell of Appleton is a recent graduate

from the University of Minnesota medical school and is now intern at the General Hospital in Minneapolis.

Dr. and Mrs. R. L. Burns of Two Harbors recently returned from a trip to Appleton, Wis., where they attended the golden wedding anniversary of Dr. Burns' parents.

Dr. G. V. Lynch has resigned his fellowship in surgery in the Mayo Foundation and has gone to Oshkosh, Wisconsin, where he will engage in the practice of surgery.

Dr. Arthur Bremkin, who has been associated with the Pine River Hospital, Pine River, Minnesota, for the past twelve years, has located at Waubun for private practice.

Dr. J. H. Kauffman of Cary has purchased the practice of Dr. R. W. Huffman at Elgin. Dr. Huffman has left for California, where he and his family will make their future home.

At the recent meeting of the Minnesota Sanatorium Association in St. Paul, Dr. M. George Milan of Thief River Falls was elected first vice president of the organization.

Announcement has been received of the wedding of Dr. Wendell L. Downing of the LeMars Clinic, LeMars, Iowa, to Miss Marion Klenk, which occurred at Buffalo, June 22.

Dr. W. B. Cannon, professor of Physiology at Harvard Medical School, gave a Mayo Foundation lecture at the Mayo Clinic June 20. His subject was, "Effects of the emotions on the body."

Dr. Richard E. Anderson of the Union Clinic, Willmar, was married Saturday, June 24, at Chicago, to Miss Caroline M. Schwartz of that city. Dr. and Mrs. Anderson are now at home in Willmar.

Dr. C. A. Ryan is now physician in charge at the Buena Vista Sanatorium, Wabasha. Dr. Ryan is a graduate of McGill University Medical College and has had special training in tuberculosis work.

Mr. and Mrs. Charles R. Teas of St. Paul have announced the marriage of their daughter, Madeline Teas Wood, to Dr. Stanley Robert Maxeiner of Minneapolis, which took place Thursday, July 27.

Dr. Walter N. Lee of Madison, Minnesota, has returned from a three weeks' encampment with National Guard troops at Camp Phillip Shelley, Lake City, Minnesota. Dr. Lee is a captain in the medical corps.

Dr. G. R. Moloney of Belle Plaine left July 13 for a two months' trip to his birthplace in Ireland. This is Dr. Moloney's first return to his home after a period of fifty years spent in the United States.

Dr. L. B. Wilson, Dr. L. S. Rowntree, Dr. Wm. L. Benedict, Dr. George B. Eusterman and Dr. Kendall represented the faculty of the Mayo Foundation at the commencement exercises at the University of Minnesota.

Dr. A. W. Adson of Rochester presented papers before a special meeting of the Utah Medical Association in Salt Lake City in June. He also attended the Pacific Northwest Medical Association meeting at Spokane in July.

Dr. A. G. Beyer, who has been in New York the past three months specializing in the study of the treatment of the eye, ear, nose and throat, has returned to Red Wing to take up his work in the firm of Drs. Johnson and Beyer.

The marriage of Dr. Ellsworth Johnson of Windom and Miss Carolyn Clark of St. Cloud took place in St. Cloud June 10. Dr. and Mrs. Johnson are now at home in Win-

dom following a trip through the northern part of the state.

Dr. E. L. Strader, superintendent of the Mineral Springs Sanatorium, Cannon Falls, and Miss Blanche Lizee, also a member of the sanatorium staff, were married June 28. Dr. and Mrs. Strader will make their home at the sanatorium.

Chester E. Sturges of Buffalo, Minn., graduated with honors from the University of Iowa Medical School this spring. He will take his internship and act as assistant house physician in an Omaha hospital before entering private practice.

The marriage of Dr. Lawrence J. Leonard, Minneapolis, and Miss Vera May Buckholz took place in Minneapolis June 29. Dr. and Mrs. Leonard will be at home in Minneapolis after their return from a trip through Yellowstone National Park.

In honor of his services as a physician over a period of fifty years, Dr. Ira Bishop of Mapleton was given a reception at Lura Lake the latter part of June. Dr. Bishop has gradually given up his practice after a lifetime devoted to his profession.

The marriage of Miss Marion Brown of New Orleans, La., to Dr. Shirley C. Lyons of Lake Charles, La., who has been a fellow in the Mayo Clinic at Rochester the past year, was solemnized at the home of Dr. and Mrs. E. L. Sinclair of Rochester, June 30.

Dr. Robinson Bosworth of the advisory board of the Minnesota Public Health Association, discussed the need of a tuberculosis sanatorium in southern Minnesota at the annual meeting of the County Public Health Association in Mankato last month.

Dr. H. L. Lamb has disposed of his medical practice at Sauk Centre to Dr. E. H. Richter of Minneapolis, who has recently completed his internship at the University General Hospital in Minneapolis. Dr. Lamb has located at Little Falls, where he plans to devote his time to the treatment of the eye, ear and throat.

Three St. Cloud physicians, Drs. Fred H. Stangl, P. E. Stangl and Irwin E. Bowing, have opened an exclusive medical office building in that city on the corner of First Street and Seventh Avenue South. Dr. Bowing with Dr. Fred H. Stangl recently came from Chicago to join Dr. P. E. Stangl in his practice at St. Cloud.

Dr. T. J. Trutna, Silver Lake, is in Chicago to take up special study in x-ray work, infant feeding, and eye treatment. He is attending clinics at the Illinois Post Graduate School, also clinics at other schools located in Chicago. Dr. M. F. Guyman of Minneapolis has charge of Dr. Trutna's practice during his absence.

Dr. Elmer Harry Hansen of Minneapolis and Miss Mary Elizabeth O'Brien, daughter of Mrs. John T. O'Brien, Cloquet, were married at the home of the bride's mother, June 28. Dr. and Mrs. Hansen have returned from a camping trip through the northern part of the state and are now at home at the Curtis Hotel, Minneapolis.

Dr. William Dodge, accompanied by Mrs. Dodge and his son, Warren, is motoring through Yellowstone Park, Great Falls and Kalispell, Mont., to Spokane, down the Columbia River to Portland, Oregon. They will return by way of Seattle. Dr. W. A. Hanson of Minneapolis is taking charge of Dr. Dodge's practice during his absence.

Dr. H. M. Wheeler of Grand Forks and Miss Mae McCulloch, formerly city visiting nurse in Grand Forks, were married in Minneapolis July 3. For the past two years Mrs. Wheeler has been engaged in special public health work in Cleveland and Mount Vernon, Ohio. Dr. and Mrs. Wheeler are now at home in Grand Forks.

Dr. Frank Lynam of Duluth, who is doing relief work in Russia, reports that patients in Russian hospitals are in dire need of food. Dr. Lynam, as representative of the American relief administration in the Kharkov district, states that the situation has been somewhat relieved of late. Thirty-seven hospitals in the district have been outfitted.

Dr. H. E. Bowers of Lake City has purchased the practice of his brother, Dr. J. T. Bowers, in the firm of Drs. Bowers and Bowers of that city. Dr. W. J. Cochrane, who practiced in Lake City for 20 years, but who has been located the last year at Monticello, Iowa, has announced his intention of returning to Lake City, September 1, to be associated in practice with Dr. H. E. Bowers.

Dr. Bert G. Anderson, who has charge of oral diagnosis at the Earl Clinic, St. Paul, has left for Peking, China, where he is to become instructor in the Peking Union Medical College, conducted by the Rockefeller Foundation. Dr. Anderson, who besides his clinical work was assistant professor at the University of Minnesota medical school, will have the same work at the Chinese institution.

Appointment of Dr. D. L. Bristol of Harvard University to head the department of public health and preventive medicine, recently created at the University of Minnesota, has been approved by the University Board of Regents. Professor Bristol taught at the medical department of the State University from 1908 to 1912, and was medical director of the St. Paul Anti-Tuberculosis Dispensary from 1910 to 1912.

The Wright County Medical Society held its annual outing at Buffalo, Thursday, July 27, for the doctors and their families. A picnic dinner at the residence of Dr. John J. Catlin, secretary of the society, was followed by a short program to which Dr. E. Geist of Minneapolis was a contributor. In the afternoon the meeting adjourned to Lake Constance for fishing and a picnic supper. Dr. Miller of Minneapolis, who accompanied Dr. Geist, showed great proficiency in the art of fishing.

Dr. Egil Boeckmann of St. Paul has been appointed to the Board of Regents of the University of Minnesota and his resignation from the State Board of Health has been accepted. Dr. C. L. Scofield of Benson, formerly vice president of the State Board of Health, was chosen president and Dr. S. Marx White of Minneapolis was elected vice president of the Board at a recent meeting. The vacancy on the Board made by Dr. Boeckmann's resignation has not as yet been filled by Governor Preus.

A committee from the Carnegie Foundation for the Advancement of Teaching is making a survey of Dental Education. The members of the committee recently spent a day at Rochester visiting the Foundation Clinic, and affiliated hospitals. The committee is composed of Dr. W. J. Gies, Professor of Biological Chemistry, Columbia University; Dr. C. A. Nixon, member of the State Board of Dental Examiners, Indiana; Dr. A. M. Reynolds, member of the State Board of Dental Examiners, Pennsyl-

vania; and Dr. C. R. Turner, Dean of the School of Dentistry, University of Pennsylvania.

The following fellows received the degree of M.S. in Surgery from the University of Minnesota June 14: Dr. C. F. Andrews, Dr. S. Brock, Dr. Hoon, Dr. A. S. Jackson, Dr. Magoun, Dr. Edw. V. Mastin, Dr. Parham, Dr. K. Renshaw, Dr. J. W. Ross and Dr. Wiese. Fellows receiving the degree of M.S. in Medicine were Dr. W. C. Chaney and Dr. Buchanan. Fellows receiving the degree of M.S. in Urology were Dr. A. R. Knauf and Dr. Latchem. Dr. Mahle received the degree of M.S. in Pathology; Dr. Bozer, the degree of M.S. in Otolaryngology, and Dr. Geo. W. Busman, the degree of M.S. in Dermatology.

Miss Grace McDonald, daughter of Dr. James McDonald, professor of physiology at Creighton University and formerly a fellow in surgery at the Mayo Clinic, became the bride of Dr. Joseph E. Heard, resident surgeon at St. Mary's Hospital, Rochester, in Minneapolis, June 28. Miss McDonald, who is a resident of Watertown, New York, has been in Rochester the past two years, engaged in the radiological department of the Mayo Clinic. Dr. and Mrs. Heard took an automobile trip through Mississippi to Fort Smith, Arkansas, where Dr. Heard will be an associate surgeon of Dr. C. S. Holt in the Holt Clinic.

Dr. Egil Boeckmann of the Minnesota State Board of Health at a recent meeting of the Board of Regents pointed out that out of 250 pre-medics only about eight will be permitted to enter the medical school in the fall. He also declared that the medical course was depriving Minnesota and the Northwest of much-needed practitioners. Dr. Mayo, at the same meeting, suggested that the medical college go on double shift in order to handle additional students. Without a formal vote, the board instructed Dr. Boeckmann to make a survey of conditions relative to admissions to the medical school and to organization of the medical curriculum.

Work has begun on the new Twin City Shriners' Hospital for Crippled Children. It is to be located on the River Boulevard on the east side of the Mississippi river about a mile from the end of the Franklin Avenue bridge, Minneapolis. The building will be a one-story structure, except the Administration building, which will be three stories. There will be accommodations for fifty patients in the house and it is hoped to build up a large outpatient service. The Hospital will be affiliated with the University of Minnesota so as to make the cases there available for instruction purposes. Dr. Wallace H. Cole has been appointed chief surgeon.

The board of directors of St. Luke's Hospital of Duluth has perfected an organization of the attending physicians and surgeons. An advisory or executive medical board of seven, consisting of Drs. J. J. Eklund, S. H. Boyer, A. N. Collins, Robert Graham, D. E. Seashore, D. L. Tilderquist and F. M. Turnbull, has been appointed. The directors also have selected a staff of fifty members, with Dr. J. J. Eklund as chief, and have approved a list of twenty-five attending men. The staff met and perfected a permanent organization on July 7, with Dr. J. J. Eklund as chief, Dr. Robert Graham as vice-chief, and Dr. M. H. Tibbetts as secretary. Provisions were made for regular monthly meetings of the staff at the hospital.

NEW AND NON-OFFICIAL REMEDIES

During June the following articles have been accepted by the Council on Pharmacy and Chemistry for inclusion in New and Non-official Remedies:

BORCHARDT MALT EXTRACT CO.:

Borchardt's Malt Cod Liver Oil and Phosphorus.

INTRA PRODUCTS CO.:

Ven Sterile Solution Procaine 0.5 Per Cent.

Ven Sterile Solution Procaine 2.0 Per Cent.

Ven Sterile Solution Procaine 5.0 Per Cent.

LEDERLE ANTITOXIN LABORATORIES:

Pituitary Extract—Lederle (Obstetrical).

Pituitary Extract—Lederle (Surgical).

PARKE, DAVIS & CO.:

Diphtheria Antitoxin piston syringe containers.

Antitetanic Serum piston syringe containers.

Antigonecoccic Serum 12 c.c. bulbs.

Antistreptococcic Serum 20 c.c. piston syringe container.

Antistreptococcic Serum 50 c.c. piston syringe container.

Anti-Anthrax Serum.

Antimeningococcic Serum.

Diphtheria Toxin—Antitoxin Mixture.

Tuberculin B. F. (Bovine).

Gonococcus Vaccine 1 c.c. bulbs.

Gonococcus Vaccine 1 c.c. syringe.

Gonococcus Vaccine 5 c.c. bulb.

Gonococcus Vaccine 20 c. blub.

Erysipelas and Prodigiosus Toxins (Coley) 1 c.c. bulb.

Erysipelas and Prodigiosus Toxins (Coley) 15 c.c. bulb.

Pollen Diagnostics-Lederle.—Liquids obtained by extracting the dried pollen of plants with a liquid consisting of 67 per cent glycerin and 33 per cent saturated solution of sodium chlorid. Pollen diagnostics-Lederle are marketed in capillary tubes containing 0.01 c.c. of a liquid, representing 100 pollen units. Pollen diagnostic-Lederle are employed in the diagnosis of hay-fever (Pollenosis). (See New and Non-official Remedies, 1922, (p. 232.) The following preparations have been accepted:

Arizona Ash Diagnostic-Lederle.—Prepared from the pollen of Arizona ash (*Fraxinus toumeyi*).

Arizona Walnut Diagnostic-Lederle.—Prepared from the pollen of Arizona walnut (*Juglans major*).

Black Walnut Diagnostic-Lederle.—Prepared from the pollen of black walnut (*Juglans nigra*).

Careless Weed Diagnostic-Lederle.—Prepared from the pollen of careless weed (*Amaranthus palmeri*).

Cottonwood Diagnostic-Lederle.—Prepared from the pollen of cottonwood (*Populus macdougli*).

June Grass Diagnostic-Lederle.—Prepared from the pollen of June grass (*Poa pratensis*).

Ragweed Diagnostic-Lederle.—Prepared from the pollen of ragweed (*Ambrosia elatior*).

Red Top Diagnostic-Lederle.—Prepared from the pollen of red top (*Agrostis palustris*).

Sage Brush Diagnostic-Lederle.—Prepared from the pollen of sage brush (*Artemisia tridentata*).

Shad Scale Diagnostic-Lederle.—Prepared from the pollen of shad scale (*Atriplex canescens*).

Sheep Sorrel Diagnostic-Lederle.—Prepared from the pollen of sheep sorrel (*Rumex acetosella*).

Slender Ragweed Diagnostic-Lederle.—Prepared from the pollen of slender ragweed (*Franseria tenuifolia*).

Sweet Vernal Grass Diagnostic-Lederle.—Prepared from the pollen of sweet vernal grass (*Anthoxanthum odoratum*).

Timothy Diagnostic-Lederle.—Prepared from the pollen of timothy (*Phleum pratense*).

Lederle Antitoxin Laboratories, New York. (Jour. A. M. A., June 10, 1922, p. 1803.)

Neutral Acriflavine-Heyl.—The base of 3:6 diamino-10 methylchloracridine, containing about 1.5 per cent of sodium chloride as a stabilizer. The actions, uses and dosage of neutral acriflavine-Heyl are essentially the same as those of acriflavine (see Acriflavine and Proflavine, New and Non-official Remedies, 1922, p. 25). Neutral Acriflavine-Heyl is also supplied in the following forms:

Neutral Acriflavine-Heyl Tablets 0.1 gm.

Neutral Acriflavine-Heyl Throat Tablets.

Neutral Acriflavine-Heyl "Pro Injectione," 0.5 gm. vials.

Neutral Acriflavine-Heyl "Pro Injectione," 1.0 gm. vials.

National Aniline and Chemical Co., New York. (Jour. A. M. A., June 17, 1922, p. 1893.)

Luminal Tablets ¼ Grain.—Each tablet contains luminal, ¼ grain. For a discussion of the actions, uses and dosage of luminal, see New and Non-official Remedies, 1922, p. 60.

Ven Sterile Solution Procain 0.5 Per Cent.—Each ampule contains 1 c.c. of a 0.5 per cent solution of procain-N. N. R. (New and Non-official Remedies, 1922, p. 35.) Intra Products Co., Denver.

Ven Sterile Solution Procain 2 Per Cent.—Each ampule contains 2 c.c. of a 2 per cent solution of procain-N. N. R. (New and Non-official Remedies, 1922, p. 35.) Intra Products Co., Denver.

Ven Sterile Solution Procain 5 Per Cent.—Each ampule contains 5 c.c. of a 5 per cent solution of procain-N. N. R. (New and Non-official Remedies, 1922, p. 35.) Intra Products Co., Denver, Colo. (Jour. A. M. A., June 17, 1922, p. 1893.)

Diphtheria Antitoxin (Concentrated Antidiphtheric Serum Globulin)-P. D. & Co.—Marketed in piston syringe containers, containing, respectively, 1,000, 3,000, 5,000, 10,000, and 20,000 units. Parke, Davis & Co., Detroit.

Antitetanic Serum (See New and Non-official Remedies, 1922, p. 282).—Also marketed in piston syringe containers, containing, respectively, 3,000, 5,000, and 10,000 units. Parke, Davis & Co., Detroit.

Antigonococcic Serum (See New and Non-official Remedies, 1922, p. 285).—Also marketed in bulbs, containing 12 c.c. Parke, Davis & Co., Detroit.

Antistreptococcic Serum-P. D. & Co. (See New and Non-official Remedies, 1922, p. 289).—Also marketed in piston syringe containers, containing, respectively, 20 c.c. and 50 c.c. Parke, Davis & Co., Detroit. (Jour. A. M. A., June 17, 1922, p. 1893.)

PROPAGANDA FOR REFORM

Evans Cancer Cure.—Dr. R. D. Evans, of Brandon, Manitoba, sells a "positive cure for cancer." The price is "one hundred dollars in advance!" The victim who parts with \$100.00 for this cruel and worthless fake is told to shave a patch about the size of a dollar on the crown of the head. The "cure" is applied to this spot. This is for the treatment of internal cancer. "For 'external cancer' the discovery is applied on the spot." From an analysis made in the A. M. A. Chemical Laboratory, it was evident that Evans Cancer Cure is essentially a mixture of 1 part of a fatty substance (such as lard) and 5 parts of dried ferrous sulphate. (Jour. A. M. A., June 3, 1922, p. 1739.)

More Misbranded Nostrums.—The following products have been the subject of prosecution by the federal authorities, charged with the enforcement of the Food and Drugs Act:

Beil's New Nerve Tablets (Beil Mfg. Co.), consisting essentially of aloin, zinc phosphid, nux vomica extractives, resin, a laxative plant drug, magnesium and iron salts.

Diemer's Prescription for Gonorrhea and Gleet (Dr. F. W. Diemer Medicine Co.), consisting of pills which contain Epsom salt, calcium sulphid, ferrous sulphate and oil of cubebs, and tablets for external use, containing boric acid, zinc sulphate and hydrastin.

Diemer's Dyspepsia Tablets (Dr. F. W. Diemer Medicine Co.), consisting chiefly of baking soda, a laxative drug and ipecac alkaloids.

Diemer's Hot Toddy (Dr. F. W. Diemer Medicine Co.), tablets containing milk sugar, baking soda, a laxative plant drug and small amounts of ginger and red pepper.

Salicylates "Natural" and "Synthetic."—The Wm. S. Merrell Company rehearsed the definitely refuted claim that "synthetic" salicylic acid is inferior to the "natural" kind. The Merrell Company suggests that, to avoid the effects of synthetic salicylic acid, physicians should specify "natural" and "Merrell" in writing prescriptions for sodium salicylate or any of the other salicylates. About ten years ago, the Council on Pharmacy and Chemistry instituted a thorough investigation of the asserted superiority of natural salicylic acid and salicylates over the ordinary or synthetic kind. This investigation afforded conclusive proof that the claim—based on a mixture of mysticism, commercial exploitation, misinterpretation and tradition—is without foundation. Nevertheless, the Merrell Company attempts to induce the medical profession to perpetuate this exploded fallacy and to specify the Merrell product, which costs twenty-four times as much as the synthetic sodium salicylate of U. S. P. quality. (Jour. A. M. A., June 3, 1922, p. 1742.)

The Intravenous Use of Acacia.—It is now generally accepted that acacia has a limited and uncertain usefulness. The intravenous use of acacia is a recent therapeutic procedure and apparently sufficient time has not elapsed for the thorough appraisal of its use as a therapeutic remedy. Bearing in mind the accidents from the use of acacia that have been reported, the lack of agreement as to its beneficial effects, among surgeons who have tried it, the experimental evidence that has been reported as to its deleterious effects and the paucity of data indicating its clinical usefulness, conservative practitioners will still withhold their verdict. Moreover, the questions of intravenous therapy,

which are involved in any discussion on the use of acacia in shock, hemorrhage and allied conditions, are an important and serious complicating consideration. (Jour. A. M. A., June 17, 1922, p. 1897.)

Vita Zest Not Admitted to N. N. R.—The Council on Pharmacy and Chemistry reports that Vita Zest (Vita Zest Co., Inc., New York City) comes in the form of capsules and is stated to be composed of 83 $\frac{1}{3}$ per cent. of "highly concentrated vitamin extracts (Fat Soluble A, Water Soluble B, and Water Soluble C)." The amount of material in each capsule is not declared nor is any information offered to show that the amount (or potency) of the three vitamins said to be contained in the vitamin extract is determined or controlled. Even if it were shown that the product contains appreciable amounts of vitamins, the claims advanced for it are such that most enthusiastic advocates of the administration of vitamin would scoff at them. The Council declared Vita Zest inadmissible to New and Non-official Remedies, because (1) its composition is indefinite; (2) it is exploited under unwarranted therapeutic claims and in a manner which tends to its indiscriminate use, and (3) because the name suggests its haphazard use as a general tonic. (Jour. A. M. A., June 17, 1922, p. 1912.)

Laxatives—Untoward Effects of Laxatives.—Lately a number of instances of cutaneous manifestations due to the use of phenolphthalein as a laxative drug have been brought to the attention of physicians, particularly by dermatologists. Now Underhill and Errico have demonstrated that when magnesium sulphate, sodium sulphate and potassium and sodium tartrate are administered experimentally in doses capable of producing diarrhea, a distinct concentration of the blood may take place. The fact that purgatives exert a definite influence, in the direction of concentrating the blood, indicates that care should be exercised in the administration of purgatives in disease conditions, especially in those conditions known to be responsible for concentrated blood. Blood concentrated to some extent, and yet not sufficiently concentrated to be dangerous in itself, may reach a dangerous concentration by the added influence of the purgative. (Jour. A. M. A., June 24, 1922, p. 1964.)

BOOK REVIEWS

BOOKS RECEIVED FOR REVIEW

THE WRITING OF MEDICAL PAPERS. Maud H. Mellish, Editor of Mayo Clinic Publications. 12 mo. of 157 pages. Philadelphia and London: W. B. Saunders Company. 1922. Cloth, \$1.50.

THE PRACTICE OF MEDICINE. A. A. Stevens, M.D., Professor of Applied Therapeutics in the University of Pennsylvania, Professor of Therapeutics and Clinical Medicine in the Woman's Medical College of Pennsylvania. Octavo of 1106 pages. Philadelphia and London: W. B. Saunders Co. 1922. Cloth, \$7.50.

BIRTH STATISTICS. Annual Report of Department of Commerce Bureau of the Census, 1920. Washington Government Printing Office. 1922. 35c.

APPLIED CHEMISTRY. Fredus N. Peters, Ph.D., Instructor in Chemistry in Central High School, Kansas City,

Mo., for 23 years. 461 pages. Illus. St. Louis: C. V. Mosby Company. 1922. Cloth, \$3.50.

SYMPTOMS OF VISCERAL DISEASE. Francis Marion Potter, A.M., M.D., LL.D., F.A.C.P. 357 pages. 86 text illustrations. 10 color plates. St. Louis: C. V. Mosby Company. 1922 2nd edition. Cloth, \$5.50.

OPERATIVE SURGERY. J. Shelton Horsley, M. D. Cloth, 721 pages with 613 illustrations. C. V. Mosby Co., St. Louis, 1921.

Dr. Horsley's book is written primarily from the point of view of preservation of physiologic function. It is written in a style that holds the reader's attention throughout, giving the author's experiences with various operative measures in a clear and concise manner. Operative procedures, now in vogue, which he does not believe result in restoration of function, he vigorously condemns.

It will be impossible for the reviewer to cover such a comprehensive field so a brief sketch will merely be given.

The early chapters deal with the generalities of surgery, such as general technic, drainage, etc. The chapter on drainage can be summed up in the statement that, "drainage really depends on the reversal of circulation in the local lymphatics."

The author, in his chapter on blood vessel surgery, introduces a method in which he uses essentially the Carrel technic but differs in that he uses a hook shaped frame which he calls an "arterial staff" to which he attaches his stay sutures. Instead of the running stitch of Carrel he uses the cobbler's stitch. He says that the surgeon should complete the operation in fifteen minutes, but with such an elaborate technic the reviewer feels that it could only be possible in the hands of the originator.

To become famous all that is necessary is to modify someone's technic in plastic surgery, a field unnecessarily filled with names. There are sufficient methods described for the operator to choose for all his needs.

Horsley believes that Bassini's operation results in 95% cure of indirect hernias, also describing the operations of Ferguson and Andrews but stating that his results have not been as good with these two operations.

In the removal of gall-bladders he follows the technic of Judd, in which the cystic duct is doubly clamped and the gall-bladder dissected from below upward. The raw surfaces left by the removal are closed by suturing the tissues together.

He does not use the technic of removal of the appendix by purse string and inversion but that of simple ligation and cautery. His statement that "in the majority of cases in which the stump has been buried I have found either unusual adhesions or a lump in the bowel or else a diverticulum," is questionable and will undoubtedly provoke a great deal of criticism.

The book is well illustrated and the illustrations are admirably drawn.

As a whole the book reflects conservatism and common sense and it will take its place among the better works on operative surgery.

ARTHUR H. PEDERSEN, M. D.

THE PLACE OF VERSION IN OBSTETRICS. Irving W. Potter. Published by C. V. Mosby & Co. Price \$5.00.

In view of the fact that the subject matter of this small

volume has appeared in the literature from time to time and has been commented on, both favorably and unfavorably, we shall endeavor to give a more detailed review of the book and to do so with an unbiased mind.

Let no one lose sight of the fact that Dr. Potter is a mighty clever obstetrician and that on the whole he is very likely getting comparatively good results with his methods of delivery, and while there are many fine points about his technic, it does not follow that we can endorse the method as a whole.

All forceps deliveries and all versions done for good and sufficient reasons might be more successful if the operator carried out some of Potter's preliminaries, i. e., thorough intestinal cleansing, catheterization, surgical cleansing of the field of operation, ironing out of the perineum, complete cervical dilatation, separation of membranes and rupture high up, grasping of both feet (even the German text books recommend that no time be wasted in looking for the second foot, but to bring down both feet may be a greater advantage than is generally realized) and lastly the elimination of all rough handling of the newborn child; also the partial Walcher position and complete anesthesia.

That he is clever and careful is evidenced by the fact that he claims never to have had a case of uterine rupture, and it is plain that he evidently gets fewer and less severe lacerations. He repeatedly cuts the cord before delivery and has never caused injury to the child by so doing, and in at least two cases of placenta previa he separated and delivered the placenta before delivering the living child.

There are several things we would criticise, or at least question. He always uses his left hand and in all his illustrations a left-sided position is given. We would like to see illustrations of an actual performance of a left-handed version in a right position.

Potter does not think that bags can bring about a dilatation in any way comparable to the natural process. Neither do we, but is it not a fair question to ask if he thinks that his manual dilatation does?

He does not lay much emphasis on the information afforded by the pelvimeter and states that "the operator should at all times have a perfect knowledge of the position of the child in utero before version is attempted and an exact knowledge of this can be obtained only by introducing the hand to the fundus and exploring the uterus and the fetal parts carefully. This impresses us as being rather radical. On another page he states "the hand is now free in the uterine cavity, the position of the child is made out and its probable size estimated, the position of the cord ascertained and the diameters of the pelvis approximated." The first part of this can be done by external examination; Ahlfeld's method, Muller's maneuver, and the use of the pelvimeter with the use of an anesthetic ought to give us reliable information, except perhaps in a few border-line cases. He suggests that this information be obtained before version is attempted; may we suggest that he get it before version is even contemplated.

The baby's feet are delivered together in the anterior-posterior diameter of the outlet and from here on the exposed parts of the baby are rotated as follows:—a rotation of 90 degrees to the right so that the fetal pelvis presented with its sacrum posterior; then a rotation of 180 degrees

to the left so that the back is delivered anteriorly; then again 90 degrees to the right so that the left arm comes under the symphysis; then again 180 degrees to the left so that the posterior arm comes under the symphysis; then again 90 degrees to the right so that the face is delivered over the perineum.

He claims for his method that it offers great advantages for the mother, the child and the obstetrician. May we not be in danger of placing too much emphasis on the last three words?

As to Potter's results: His first paper, which was never published, deals with 500 versions without a maternal death. Fine work! He had 57 stillbirths in all and from all causes, 11.4 per cent. On this total, two-thirds were due to prolapsed cord and presumably to the version itself, as no other reason is stated. He does not state whether the prolapsed cord was present before he undertook the version, whether it developed during the version or was present after the version was completed. He certainly encounters many prolapsed cords and we all know that breech presentation and version are prolific in producing them.

In his second paper he reports an additional 200 versions without a maternal death in a total of 515 deliveries. Instruments were necessary for the aftercoming head 10 times, or 5 per cent. There were 15 cases of prolapsed cords, or 7 per cent. There were 16 stillbirths, of which 50 per cent were due to prolapsed cords. Three perineæ were repaired with two silkworm sutures each but they had all been forceps delivery of the aftercoming head, all in primiparæ, all had large babies and they were all alive. Good results! He does not mention the number of Cæsarean sections.

In the following year he had 1,113 deliveries, of which 920 were by version and 80 Cæsarean sections, or slightly over 7 per cent. Twice the instruments were necessary for the aftercoming head and five deaths were due to prolapsed cords, in a total of 41 stillbirths, or slightly over 12 per cent.

In his last report he had 1,130 deliveries, of which 938 were by version and 100 by Cæsarean section, or about 9 per cent, and only twice were the forceps necessary for the aftercoming head.

While Potter's whole procedure looks and is radical, he does get good results, has few lacerations and no trouble with the head. But he does encounter a large number of prolapsed cords and they produce a large share of his stillbirths. He denies his patients everything that is understood by the test of labor and he performs a large and an increasing number of Cæsarean sections because of it. A man who personally delivers 1,130 women in one year must shorten the hours of labor.

ALBERT C. SCHULZE, M. D.

For Sale—Southern Minnesota \$5,000 general practice; no hospital or surgeon; good possibilities for both with general practice; modern town 2,000; prosperous farming section; collections 98 per cent; competition ethical; \$2,000. Address B38, care MINNESOTA MEDICINE.

Have the best location for an eye, ear, nose and throat specialist in Minneapolis. Office with physician and dentist. Established ten years. Rent reasonable. May be occupied at once. Address MINNESOTA MEDICINE, B39.

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ORIGINAL ARTICLES

MOBILIZATION OF JOINTS WITH BONY ANKYLOSIS*

WILLIS C. CAMPBELL, M.D.
Memphis, Tenn.

The mobilization of joints with bony ankylosis is, as yet, an unsolved problem. Little real advance has been made until recent years, for we must depend entirely on our experience as acquired on the human subject, animal experiments being of little value, for active movements and intelligent co-operation are essential to success. In a chronological survey of the subject, one is impressed with the lack of definite data, the report of results being too early and too few to be worthy of consideration. Recently, McAusland has analyzed a large series of elbows, Baer has given his results on various joints, and Henderson has submitted statistics of 43 arthroplasties from the Mayo Clinic and 395 from other surgeons. Arthroplasties of the knee in twenty-four cases, from our records, were discussed in an article before the American Orthopedic Association in 1921 and later published.†

The mobilization of an ankylosed joint may be accomplished by simple excision provided sufficient bone is removed, but such a procedure may render the part weak and unstable. To reconstruct a joint with a wide range of motion and stability that will stand the strain of average daily use, is a far more difficult problem. However, unless such a result can be secured a stiff joint in the most useful position is preferable.

In only selected cases should operative procedures for mobilization of ankylosed joints be considered. The following pathological conditions, encountered in such joints, decrease the chance of success or actually contraindicate surgical measures:

1. Tuberculosis: In no case should a joint be entered for the purpose of mobilization when tu-

berculosis was the causative agent in the production of ankylosis. Undoubtedly it might be possible to obtain excellent results in some instances, but the probability of "lighting up" a latent tuberculous process is well known and should be sufficient warning against surgical measures.

2. In those in which a destructive osteitis in early life has obliterated the epiphysis, a materially shortened extremity is encountered. Mobilization of such a joint obviously would not be of sufficient advantage to justify the means.

3. Extensive scar tissue, binding the skin to the bone, may render the procedure unsuitable.

4. Extreme muscular atrophy with reorganization of bone structure, as is seen when a bony ankylosis has existed over a long period of time. The medulla may pass through the joint, producing a canalization with rearrangement of the lamellæ. In such an instance, sufficient base would not be found to reconstruct a functional joint; besides, the open medullary canal might be a factor to be considered—and, the muscular apparatus being extremely atrophic, the restoration would be difficult.

5. Old dense eburnated bone, when found for a considerable distance on both sides of the joint, is not favorable soil for reproduction of a movable joint. Such a condition is usually caused by an extensive virulent osteomyelitis, the result of which is low grade bone tissue, which bears the same relation to normal bone that scar tissue does to normal soft tissues. In fact, healthy spongy bone should compose the articular surfaces of the new joint. Consequently, the chance of success is very slight when the structure of the bone has been transformed for one or more inches beneath the joint line.

There are, in reality, only two conditions that cause ankylosis in which open surgical procedures should be employed for the purpose of restoring motion: (1) *traumatism*—crushing of the joint surfaces, tearing of the periosteum, or multiple fractures, followed by bony ankylosis; (2) *acute infectious arthritis* due to staphylococcus, streptococcus, pneumococcus, gonococcus, etc. These organisms erode and disintegrate the cartilages and the superficial bone, unless the infection begins in the shaft, and then we have an extensive osteomyelitis and not a localized arthritis.

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It is hardly necessary to state that sufficient time should elapse after all acute symptoms have subsided. Children are not suitable subjects, as a rule. The prognosis is better between the ages of 20 and 30, though our oldest case was 50 years of age.

This operation should not be lightly undertaken. The social status, occupation and co-operative intelligence or "grit" of the patient must be duly considered. For instance, a young woman with ankylosis of the elbow at about 160 degrees flexion, with the forearm in pronation, applied for treatment. She was a pianist and in her present state able to pursue her vocation. We declined to do the operation though good function might have been secured, for we could hardly be sure of obtaining the required degree of pronation essential to successful performance on the piano.

All operators usually reproduce, as far as possible, the normal joint; but there seems to be a difference of opinion as to the material to be interposed between the bony surfaces. There are six methods in common use, as practiced by various surgeons:

1. Wide excision of articular surfaces, which usually causes instability and should not be considered.

2. Pedunculated fascial flaps have been extensively employed between the articular surfaces, after remodeling or carving out a new joint.

3. Interposition of animal membranes, specially prepared, as Cargile's, Baer's pig bladder, Allison's fascia, etc., have been used. While success has been reported, the disadvantage is that foreign body irritation invites infection and the material is often extruded.



Flexion of hip six years after operation.



Flexion elbow one year after operation.

4. Transplantation of free fascia lata between the joint surfaces.

5. Transplantation of free fat between the joint surfaces.

6. Mechanical reconstruction of the articular surfaces with removal of sufficient bone to secure mobility without the interposition of any substance.

Recently, we have employed a seventh method in elbows, which has been satisfactory in a limited number, and is described below.

We have operated to restore function in over one hundred joints with bony ankylosis, extending over a period of ten years. There have been many failures, but we have been rewarded by a number of successes, which have progressively increased each year. Practically all have been materially benefited by correction of deformity and placing the member in the most useful position. There have been no deaths or serious consequences.

The technique of arthroplasty or neo-arthritis differs as do the mechanics of various joints. A reproduction of the joint in detail is not essential; in fact, unnecessarily complicates the procedure. A joint should, however, be constructed to meet the requirements of the normal, and have the same action. To make a new spine, tuberosities, condyles, intercondylar notch, etc., at the knee is of no value except from a cosmetic radiographic standpoint, as no crucial ligaments or semilunar cartilages are forthcoming. We construct one large condyle on the lower extremity of the femur and



Extension of elbow one year after operation.

a shallow cavity on the upper extremity of the tibia.

In the hip joint, a new head and acetabulum is made, however. Sufficient femoral neck must be present if a ball and socket joint is reproduced. A pedunculated fascial flap is easily obtained and in our experience has given the best results.

In the jaw, Henderson has demonstrated that normal function may be obtained by wide excision without the interposition of any membrane or tissues.

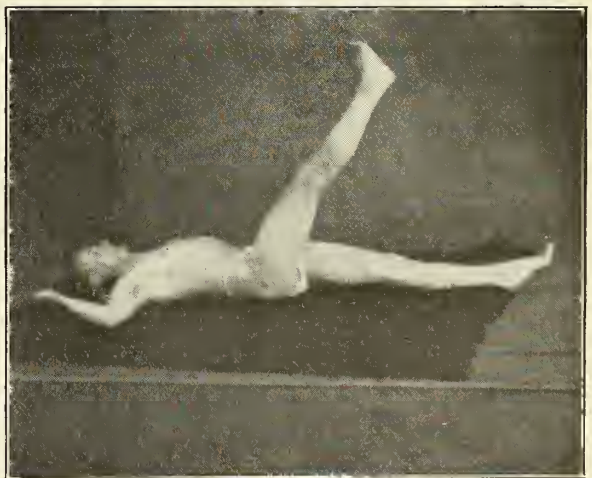
The elbow lends itself well to mobilizing operations. Function may be obtained by wide excision, but such joints are weak and unstable. We make an external lateral incision exposing the triceps muscle with its broad aponeurosis which is dissected out, making a long tongue of dense fascia, the fibres of the muscle being incised in the midline to the humerus over the lower third, after which the entire mass is separated from the bone. This gives free access to the joint, which is remodeled, making a convex surface on the lower extremity of the humerus. The surface of the sigmoid cavity and radius is denuded. The muscle fibres of the triceps, with fascia and periosteum, are stitched to the anterior capsule, making a viable flap between the articular surfaces. If for any reason this flap cannot be employed, the tendinous aponeurotic tongue, above described, is placed between the surfaces. No attempt is made to mobilize the radio-ulnar articulation.

In the shoulder joint there is rarely a complete destruction of the articular cartilage on the head of the humerus or through the glenoid cavity, a factor which should be utilized. After incision into the joint, all scar tissue is excised and in some cases the entire capsule. The relation of the joint surfaces are changed by moving the head of the humerus so that normal cartilage will articulate with the glenoid fossa. A fascial flap can be easily interposed if necessary.

In other joints similar principles, as in the hip, knee, elbow and shoulder, have been applied.

The amount of bone to be removed is variable in different joints and also in the same joint in different individuals. In those with lax joints and weak musculature less bone should be excised. Fascial and capsule contractures must also be taken into consideration. When possible, much can be accomplished by conserving articular cartilage, recesses of normal healthy synovial membrane and other structures.

I have interposed all of the materials described, Baer's membrane, pedunculated fascia, muscle, fat, free fascia transplant, and, in some cases, no intervening structure at all. I am convinced that some material should be placed between the joint surfaces, not alone from my personal experience in mobilization of ankylosed joints, but because in ununited or delayed union in fractures, fascia, muscle or periosteum have been an evident cause of the formation of pseudo-arthritis. No structure is suitable for all cases, but when possible a living viable flap should be employed. Traction is used to separate the joint surfaces and prevent pressure necrosis of the intervening membrane.



Flexion hip with knee extended six years after operation.



Flexion six months after luni-arthroplasty.



Extension six months after heuri-arthroplasty.

In bony and fibrous ankylosis, the procedure is the same if there is destruction of the articular cartilage. However, contracture of the peri- and extra-articular structures often taxes one's ingenuity to the limit to accommodate motion. Various plastic arrangements are required and the question of circulation must be studied in detail or tissue sloughing will occur. For instance, if there is a contracture of the quadriceps, motion is not possible unless this structure is elongated.

The after-treatment is begun as soon as there is healing of the wound. This requires the constant surveillance of the surgeon with the aid of an effi-

cient physiotherapist. Active motion is encouraged, and passive movements daily increased. An intelligent co-operation on the part of the patient is essential, for, unless voluntary motion is secured within thirty days, there is little chance of success. In lower extremities weight bearing is allowed as soon as tenderness has subsided, which materially aids in restoring function.

It is not feasible in so general a discussion to give a more detailed description of the various procedures relative to each joint, but I desire to impress the importance of considering the joint with all its component parts. If progress is to be



Flexion knee two years after operation.



Extension knee two years after operation.

made we must not alone restore the articular surfaces and synovial membrane, but, also, the capsule, muscles, fascias, bursæ, etc., must again assume a complex synchronous physiological normal action or function. This is not only acquired by a correct anatomical adjustment but also by a system of re-education. If we will bear this in mind and also that such cases should be carefully selected, a distinct advance will be made in this field of surgery.

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RECONSTRUCTION OF TIBIA BY UTILIZATION OF THE FIBULA*

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It is not extremely unusual to find that the shafts of the long bones are lost or destroyed, in part or as a whole, as the result of osteomyelitis, by the removal of tumors, from battlefield fractures, or in civil practice following severe compound fractures with infection. The tibia shares with the other long bones this liability to the loss of its shaft from the above mentioned etiological factors. In addition, fractures, especially compound fractures of this bone, are more liable to be followed by non-union than fractures of any other bone excepting perhaps the humerus. Because of the weight bearing function of the tibia, if non-union does occur, deformity results and the patient is necessarily crippled.

Much clinical and experimental work has been done in an effort to restore the defects in the shafts

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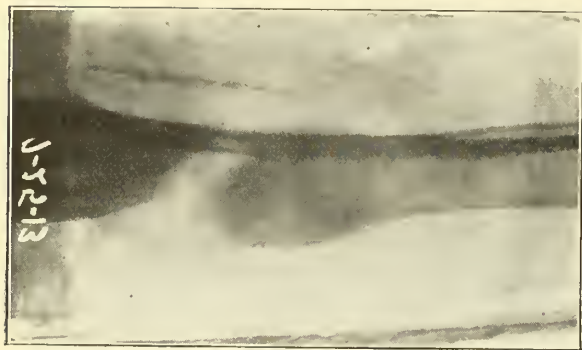


Fig. 1. Case 1. July 25, 1913. Appearance of leg when first seen by us more than two years after accident.

of bones following injury or disease. Nichols¹ discusses in detail the result following conservation of the periosteum in cases of destruction of the shaft as the result of osteomyelitis. He reports two cases where there was nearly complete regeneration of the shaft of the bones at the end of four months; these patients then disappeared so the end results were uncertain. He reports two cases of functional failure at the end of several years, and eleven cases where, there being only a small loss of bone, good functional results were obtained.

This method of conserving the periosteum was and still is of value, yet the more modern method of autogenous bone transplantation has largely superseded the efforts to repair defects in the shafts of bones by the method mentioned by Nichols, by the use of Senn's decalcified bone chips or by an organized clot. The use of the autogenous bone transplant, either as an intramedullary graft or preferably as an inlay, is generally attended by success. We believe 80 per cent of the cases of non-union, or those cases with loss of some substance of the shaft, will be restored by the exhibition of this method. That there are cases, how-



Fig. 2. Case 1. March 30, 1914. After first bone grafting—inter-medullary graft.

ever, which do not respond to this type of treatment, we unfortunately are obliged to admit. It is in this exceptional case then that we must have recourse to some other method of restoring the bone and limb to usefulness.

Huntington² reports a case where he used the fibula to replace the tibia when the shaft of the latter bone had been lost. His report was followed by a report by Stone,³ who as well reported a like case of the utilization of the fibula, although his technic varied slightly from that of Huntington. Bond⁴ reported two such cases. All four of the cases reported, ultimately obtained good functional results.

Because of the paucity of the literature and the extreme rarity of this condition, and because in the two cases we report bone grafting had failed utterly, I am constrained to report our experience in the transplantation of the fibula to take the place of the loss of the tibia.

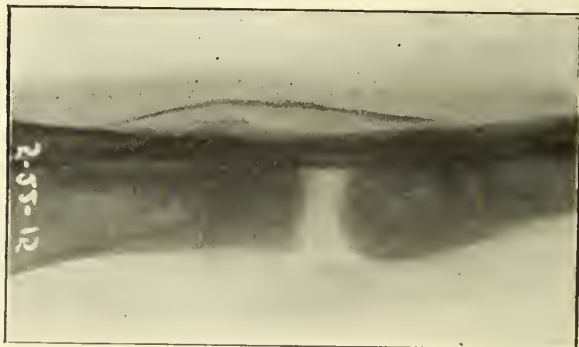


Fig. 3. Case 1. June 22, 1915. A year later, showing absorption of graft.

It is worthy of comment that when the fibula is swung over from its normal habitat and mortised below the knee and above the ankle joint into the remains of the defective tibia, while it is in effect an autogenous transplant, instead of receiving its nutrition in its new habitat by osmosis until such time as its new blood supply is re-established (as do all bone grafts), this graft carries with it its own blood supply already permanently established. The fibula as a graft simply suffers the inconvenience of being shifted from its normal position and of being sectioned above and below where it is mortised into the tibia. There is no necessity for this transplant to be osteoconductive, osteogenetic or in any way to change its morphology except to meet the necessity of union where it contacts with the tibia. According to Roux's law we would expect this transplanted bone

to adapt itself to the needs of a weight-sustaining bone and hypertrophy, this hypertrophy being its response to the physiological demands put upon it. As my radiograms will show, this is exactly what happens.

Providing the lower end of the fibula is left so the mortise of the ankle joint is not interfered with, it has become an established surgical fact that the shaft of the fibula can be removed and used elsewhere without in any way interfering with the function of the leg.

Not infrequently infection persists at the site of the non-union of the tibia. When the fibula is sectioned above and below, preliminary to swinging it over to be used as a graft, the points of section are remote from the infected area and may be kept clean. As the shaft swung towards the infected field has its own undisturbed periosteum and blood supply, it is not jeopardized but survives intact, while a free bone graft transplanted into the same area might be lost.

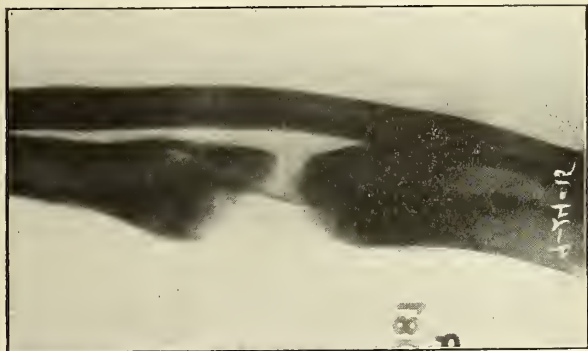


Fig. 4. Case 1. September 24, 1915. Four months later, showing periosteal bridge left from bone graft.

Case 1. M. V., Duluth, Minn. Girl, aged 16.

History: In the winter of 1911, while sliding down hill, she crashed into the sidewalk, severely crushing and lacerating the soft tissues of the left leg and as well receiving a severe compound comminuted fracture of the middle third of the tibia and fibula. There was a loss of four inches of the shaft of the tibia. Five weeks following this fracture she was Lane plated. This plate was later removed. When this girl consulted us on the 24th of July, 1913, she had already been subjected to eighteen operative procedures on this leg under general anesthesia. When admitted to the hospital she had a discharging sinus and non-union of her tibia with tremendously clubbed, enlarged, eburnated ends of the fractured bone. The preliminary operation was done on July 28, 1913, simply to curet out the sinus and remove sequestra. The child was ordered home to Duluth with instructions to report six months after the sinus had healed. This she did, and on the 30th of March, 1914, a six-inch intramedullary bone graft taken from the other tibia was inserted into the site of fracture. The avenue of approach

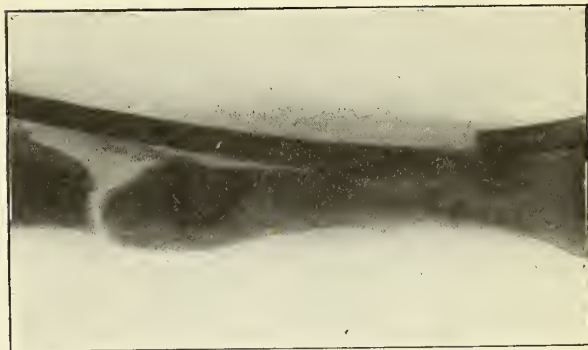


Fig. 5. Case 1. December 17, 1915. Showing absorption of second bone graft, this time a cortical inlay—also showing the mortising of the lower end of the fibula into the tibia.

was through the posterior part of the calf in an attempt to reach the site of non-union through tissue of better vitality than the dense mass of scar on the front of the leg. This graft healed in without any trouble, yet the major portion of it bridging the defect of the tibia promptly absorbed, without union taking place. Again on May 28, 1915, I inserted a nine-inch inlay graft with periosteum and endosteum, taking the graft from the lower fragment of the tibia. This graft, as well, healed in without infection and it, as well, absorbed, leaving only a small strip of periosteum bridging the defect. We believe the loss of these grafts was due to improper vascularization because of the great amount of scar tissue following her other operations. Six months later (November 12, 1915), as the periosteal bridge showed no tendency to proliferate bone, and as non-union still persisted, we obliquely sectioned the fibula just above the malleolus, cut an oblique mortise in the lower fragment of the tibia, swung the fibula over into this mortise, and put the leg in a cast. On December 29, 1915, the upper end of the fibula was obliquely sectioned and mortised into the proximal fragment of the tibia in the same way and a cast applied reaching above the knee joint. The fibula had united firmly in its new bed when she was discharged.

We have been privileged to examine this case repeatedly since the last operation in 1915 and find the girl walks normally without a limp; the fibula has greatly hypertrophied to meet the weight-bearing demands put upon it. But more interesting still, over the periosteal bridge there has been

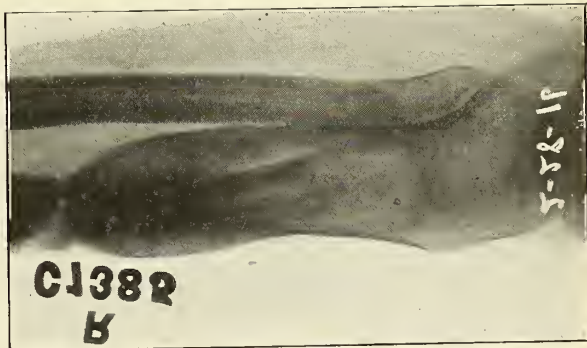


Fig. 6. Case 1. February 27, 1916. Showing hypertrophy of fibula and upper end of mortise to tibia. Also showing slight regeneration of bone over periosteal bridge.

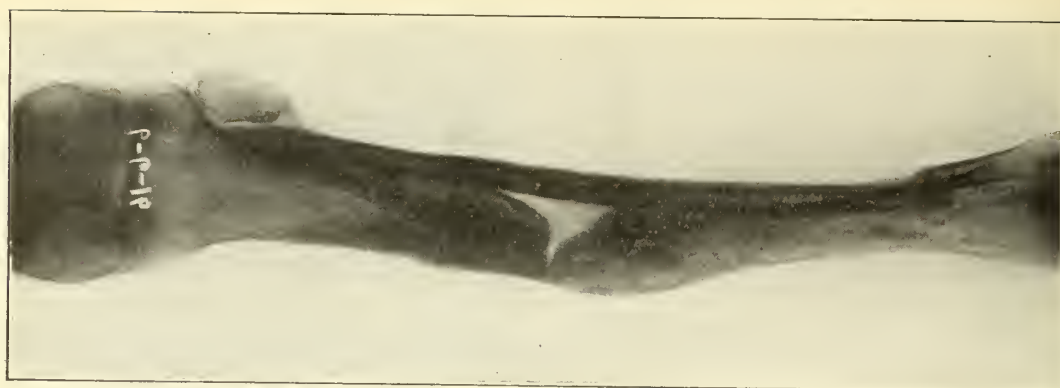


Fig. 7. Case 1. June 6, 1916. Showing whole fibula swung over and mortised into tibia, also further regeneration of bone over periosteal bridge.

a steady gradual building up of bone in the tibial defect until in 1921, as the skiagraph shows, the tibia has entirely repaired itself. From 1911 to 1915, at the hands of various surgeons, this girl had twenty-three surgical operations performed upon her. She now has a normal leg and no shortening.

A case in the practice of Dr. J. A. Johnson, who was good enough to let me see him and give me the history.

Case 2. H. H., Bend, Oregon. Age 25.

History: On November 29, 1912, he fell off a cliff onto the railway tracks and was run over by a construction train, sustaining a severe compound comminuted fracture of the right tibia, with much loss of bone and soft tissue. The tibialis anticus and most of the peroneal muscles with the external popliteal nerve were destroyed.

On July 1, 1913, Dr. John B. Murphy, in Chicago, first removed a sequestrum; then, on October 1, 1913, he did a plastic and swung a pedicled flap of skin over from the left leg to cover the area of tissue loss in the right. On February 16, 1914, Dr. Murphy took a five-inch graft from the left tibia and did an intramedullary graft in the defective right tibia, bridging a three-inch defect. This bone graft did not survive and the non-union persisted.

On October 1 and December 15, 1917, Dr. J. A. Johnson swung the fibula over and mortised it into the defective tibia above and below as I had done in the previous case. The lower mortise united firmly, but the upper fragment of the tibia was markedly osteoporotic, so soft a forceps could be thrust through it. Whether because of this bone condi-

tion or because the mortise was so near the knee joint that there was some motion, no union has occurred here.

The fibular transplant has hypertrophied and he gets about with a brace. He writes there is some shortening.

The late x-rays of this case show a pocket in the tibia into which the upper end of the fibula projects, there being a false joint at this point.

This man needs further bone grafting to immobilize the transplanted fibula to the upper tibial fragment.

These two cases here reported as well as the four culled from the literature, constitute a small group which I believe proves the value of the fibular transplant when other methods have failed.

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DISCUSSION

DR. FRED H. ALBEE, New York City: I congratulate Dr. Law on the excellent results he has obtained in this case; it certainly is most gratifying, and under the conditions it was the wisest procedure to have followed.

Last evening I showed one particular case with the aid of lantern slides—and I have had quite a number of them



Fig. 8. Case 1. September 6, 1917. Showing further hypertrophy of fibula and further regeneration of bone.



Fig. 9. Case 1. November 22, 1920. Showing hypertrophy of fibula and complete regeneration of tibia.

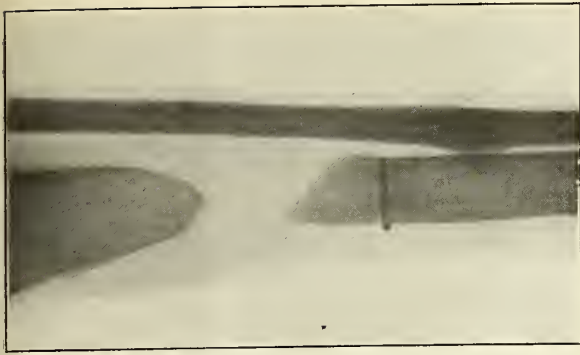


Fig. 10. Case 2. September 15, 1917. Persistent non-union following absorption of bone graft.

—where the intermediary grafts were failures, and where the inlay graft produced the result. In the case of Dr. Law the intermediary graft was put in, and the inlay graft failed. Every time an ununited fracture is operated on and a graft operation is done, or any operation is done and there is non-union, it is just so much more unfavorable at the next operation. I would counsel the use of a very careful technic at the first operation. In this particular case I reported last night there was one short inlay in one fragment and intermediary contact in the other. The inlay healed in, and the intermediary graft did not. It is interesting that the tibia should have united from the fixation and immobilization by the use of the tibial and fibular graft, which allowed bridging to take place. In following our cases of bone grafts we immobilize for a long period. In these cases we should follow the plaster cast and temporary immobilization by properly applied braces.

DR. WILLIS C. CAMPBELL, Memphis, Tennessee: I should like to say a few words in regard to this operation. In 1919, at Atlantic City, New Jersey, before the American Orthopedic Association, I reported four cases in which I adopted a similar procedure to that which has been described. In my cases there had been no previous bone grafts. The operation I did consisted of an arthrodesis with removal of the joint between the tibia and fibula, then switching the upper extremity of the fibula in, and at a subsequent operation putting a bone graft across. This operation was done in several cases before I reported it at that time, and it restored the continuity of the limb in a normal way. The other procedure is excellent.

As Dr. Law has mentioned, it is possible to obtain solid bony union by any form of bone graft with a free graft between the tibia and fibula, but on account of the type of dense eburnated bone found in these old cases of osteomyelitis, no graft will be sustained.

DR. JOHN P. LORD, Omaha, Nebraska: I hesitate to enter into this discussion. My experience, however, has been similar to that of others, but I have had some cases of what were to me real problem cases.

Four years ago I had the case of a child who had a congenital deficiency of the tibia in the central portion. The patient had been operated on five times before I got the case, and in order to bunch these cases, I will say I had another case that was practically similar to the one reported by Dr. Law in which there was loss of the central portion of the tibia from osteomyelitis. Repeated operations were

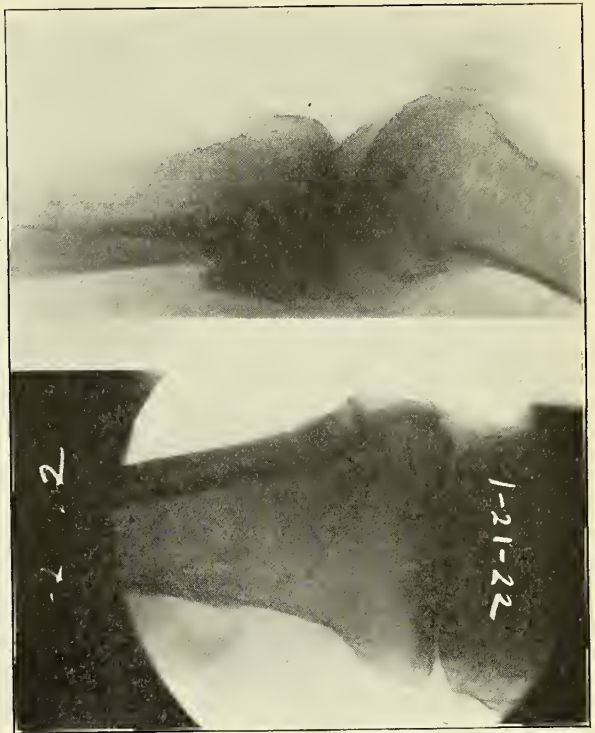


Fig. 11. Case 2. June 29, 1918. Showing mortising of fibula into tibia.

done, so that I had a lot of scar tissue in both cases. Both patients had fractures of the fibula that had occurred secondarily. Still further bunching the cases, I will cite the case of another child about the same age that had an anterior bow-leg, which was operated on by a general surgeon, who had done a double osteotomy. In doing the upper osteotomy he divided the nutrient artery, so that the lower osteotomy wound did not heal. It was followed by pseudarthrosis. There was a lot of absorption, so that when the case came to me it had about one-half inch of actual shortening and atrophy of each end. An x-ray picture of this case showed tremendous atrophy of the distal fragments. The atrophy was so great that when these cases were operated on and I went through the tissue, the bone was connective tissue, largely, and could be cut with a scalpel. This indicated to my mind that we had a real problem in getting regeneration between the atrophic fibers of the distal fragments and the graft. These cases had had grafts taken from the opposite tibia in previous operations,

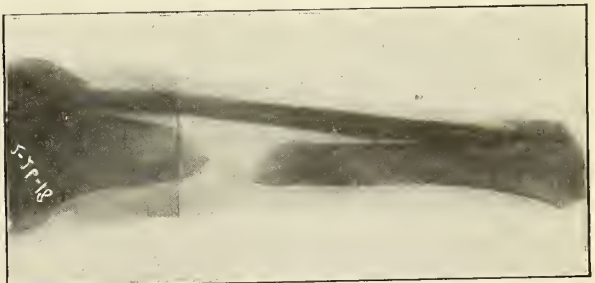


Fig. 12. Case 2. January 21, 1922. Showing false joint between upper ends of tibia and fibula.

and I did not care to go through the tibia for my graft. I had used a massive graft of fibula as Dr. Henderson does in his work. I decided to use the fibula of the mother in this case. It is my theory in transplanting grafts that we should imitate nature as near as possible and have all the elements. One of these patients came to me with a fracture inlay graft that was put in, and the longer it went the less graft there was left. As I said, I decided to use the fibula of the mother, which would pretty nearly represent the normal size of this child's tibia. That would give me the shaft, the medulla, the periosteum and endosteum and all elements for repair in the reconstruction of this case. As all of these cases had five or six operations done previously, I had many difficulties to contend with, but I succeeded in getting the grafts to heal in. I used the Albee method of a double wedge to fill in the pieces of bone. They were sprung into the joint so that there would not be much movement. The two first children were the most active kids I ever saw, and I decided that my failure subsequently was due to the activity of these children, and that I had made a mistake in not properly controlling these children. They had casts on their thighs and part of the time embracing their hips, but they were tumbling around all the time. The difficulty I found was that the longer I went the more absorption I had between my grafts in these atrophic ends of the tibia. These cases left the hospital this spring without result.

My other case was not attended with so much difficulty. I had taken a fragment from the fibula. This child was perfectly docile and I did not have the agitation to contend with that I had in the other children, and profiting by the other experience I suspended this child the way I would in treating a case of fracture of the femur by the old Hamilton method, so that there would be no motion. More than a year and a half elapsed and I did not have union in this case. Repeated study by the x-ray showed there was constant absorption going on. I felt my way and finally got to the point where we had a bridge of bone and had the case walking on his plaster cast. Just before I came here last week I saw the patient and the result was perfect.

In the cases I mentioned of the active children I had an extremely difficult proposition and if I had a good fibula in these cases I might have resorted to Dr. Law's method in getting the fibula transferred, but I did not have that difficulty. I think the principle is a good one, and may be used in some of our problem cases, but I believe in children that are repeatedly operated on as my cases were, atrophic as they were and active patients as they were, with the difficulty of keeping the part sufficiently quiet with slender bone, without a carpenter's bit we cannot get absolute immobilization, and these cases constitute difficult problems in this class of work.

I congratulated myself that I succeeded in one case in restoring the medullary canal. In the other cases where I did not succeed in having the graft to heal with the distal fragment, I had restoration of the medullary canal down to that point, but 33 per cent success is fair under the circumstances under which I labored.

DR. A. A. LAW, Minneapolis (closing): One point I did not stress in the paper was this: men are constantly and repeatedly using Lane plates in the presence of non-union. You never get union with a Lane plate when you have

eburnated sclerosed bone. General practitioners are the worst offenders in this regard. We have to take out Lane plates constantly that are put in to correct ununited fractures.

I am obliged to Dr. Albee for stressing the fact that the intermediary graft is practically obsolete. If you will notice the dates on the pictures, you will find these grafts were put in at the time when Dr. Murphy was an exponent of the use of these grafts. Since Dr. Albee has called attention to the use of the inlay graft we have used practically nothing else.

I am obliged to Dr. Lord for his description of cases which parallel mine. If Dr. Lord would have groupings made of the blood of the mother and child, I think he would find in the cases in which he got no survival of the graft, they may have belonged to different blood groups. I mentioned that fact before the American Surgical Association two or three years ago. We know that in the transplantation of skin and fascia lata and other tissue which is grafted from one individual to another, if the blood groups are identical the grafts will survive, but if the grafts are not identical they will not grow.

PRIMARY CARCINOMA OF THE APPENDIX*

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Primary carcinoma of the appendix is a topic that has been so much discussed by medical writers of the last quarter of a century that a very voluminous literature has grown up about the subject. Surgeons have reported many cases because of their comparative rarity and because of the characteristics which differ so markedly from carcinoma found elsewhere in the gastrointestinal tract. The topic has also been frequently discussed by pathologists who have used it to emphasize the importance of microscopic examination of all tissues removed at the operating table.

The condition was mentioned as early as 1836 by Merling.¹ Following this, forty cases were reported by different authors, but the first real treatise upon the subject was given in 1903 by Elting,² who reported three cases of his own and discussed the other cases of the literature in such an able manner that very little, except additional cases, has been added up to the present time. In 1908, Ralleston and Jones³ reviewed the literature and found sixty-two cases but considered only forty-two of them entirely authentic. Many of the earlier ones lacked either adequate description or microscopic verification and therefore contributed very little to the

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subject. But Harte⁴ also in 1908 found 111 cases in the literature to which he added nine of his own, making a total of 120. And, in 1917, Boyer⁵ found that 300 cases had been reported.

The apparently increasing occurrence of carcinoma of the appendix has come into prominence with the more frequent microscopic sectioning, particularly the routine examination, of all tissues removed at either the operating or autopsy table. The majority of observers find that in the routine examination of appendices from .33 per cent to .8 per cent show carcinoma. Results of various observers are shown in Table 1:

TABLE 1.

Reimann	17 cases in	13,150 or .12 per cent
McCarthy and McGrath ⁷ ...	22 cases in	5,000 or .44 per cent
McCarthy and McGrath ⁸ ...	18 cases in	3,039 or .59 per cent
Boyer ⁵	4 cases in	1,700 or .23 per cent
Boyer ⁵	0 cases in	300 or .0 per cent
(Protestant Hospital)		
Warwick ⁹	0 cases in	300 or .0 per cent
(Univ. of Minn. Hospital)		
Beldauf ¹⁰	6 cases in	735 or .81 per cent
Eltling ²	2 cases in	320 or .63 per cent
Moschcowitz ¹¹	6 cases in	2,000 or .3 per cent
Kelly ¹²	5 cases in	2,500 or .2 per cent
Miller Hospital	2 cases in	276 or .79 per cent
Total	82 cases in	29,320 or .28 per cent

From this table it appears that approximately .28 per cent of all appendices routinely sectioned as removed show carcinoma to be present. But since unusual cases always seem to appear severally, the statistics will vary markedly from time to time. For example, at the Miller Hospital, where every appendix is sectioned, none was found until December, 1921, when two appeared within six weeks' time. Therefore, the percentage of occurrence varied very markedly within six weeks' time.

One point of interest not emphasized by many of these observers is whether or not carcinoma of the appendix predominates in appendices removed because of actual symptoms, or in appendices removed incidental to operations for other abdominal or pelvic conditions. Although few actual numbers were given upon this subject, one notices upon reading the numerous case reports that in the great majority of cases actual symptoms leading to a diagnosis of appendicitis were present. McCarthy and McGrath⁸ found that 31 per cent of their cases of carcinoma of the appendix occurred in appendices removed during operations other than those for simple appendicitis. At the Miller Hospital during the past 15 months 276 appendices have been removed, and of these 167 were operated

upon because of symptoms referable to the appendix itself, while 119 were taken out during operations upon other organs. Of the two cases of carcinoma found in our series, one was removed because of symptoms referable to the appendix itself, while the other occurred in an appendix removed during an operation for a retroverted uterus. Therefore, in our small series, in the 161 appendices removed because of appendiceal symptoms, carcinoma was found in one, or .6 per cent, while in the 119 appendices removed during other operations, carcinoma was found in one, or .84 per cent.

Further knowledge on this subject can be obtained from appendices removed at the autopsy table, but only too often the pathologist, failing to detect gross signs of disease, neglects to section the appendix. However, a few statistics from this point of view are available. Kennedy examined 350 appendices removed at autopsies and found but one case, or .28 per cent, of carcinoma. Maydil and Nothgnagel,¹⁴ in a study of 41,838 autopsies, which included 3,585 cases of carcinoma, found only two cases of carcinoma of the appendix. Further detailed studies along this line will be of inestimable value in determining the exact percentage of appendices containing carcinomata.

The age incidence of carcinoma of the appendix is of interest in that it includes the years of early maturity. The greater number of cases show an average of 30 years, which is about 10 years earlier than the average age at which carcinoma appears elsewhere in the body. However, although the average is 30 years, the condition may appear at any age. For example, McCarthy and McGrath⁸ found it in a child of 7 years, and Rogg¹⁵ in a man 81 years old.

The majority of observers find that carcinoma of the appendix predominates in females. At the Mayo Clinic,⁸ 73 per cent of the cases were in females. If the condition is a purely accidental finding by means of the microscope (as the majority of investigators contend it to be), this increased incidence in females is undoubtedly due to the fact that because of the great number of pelvic operations with secondary appendectomies, more appendices are removed from females than from males.

The appendix, according to McKenty¹⁶ and Elting,² must be considered as a logical site for tumor growths for several reasons. First, it is, in a sense, a fetal remnant or rudimentary organ, and undoubtedly often contains embryonal rests of cells with great potentialities for developing neoplasms.

In the second place, representing as it does a pouch or diverticulum of the digestive tract, it is constantly subjected to a marked bacterial and mechanical irritation, due to the stasis and accumulation of intestinal contents, fecal concretions, and foreign bodies, such as fruit seeds, and we now have come to associate very definitely the presence of chronic irritation and the development of carcinomata. In the third place, it represents a constriction of the gastrointestinal tract, and at the constrictions, such as pylorus, cecum, and sharp flexures, carcinomata occur more frequently than at other points. In the fourth place, it is the frequent site of inflammatory processes which may cause fluctuations in the size and shape of the organ, with the possibility of displacing or stimulating to active growth any embryonal cells that may be present.

The great majority of carcinomata of the appendix appear at or near the tip of the organ. Some authors have suggested that this characteristic may be due to the fact that, in the budding off from the main digestive tract, remaining embryonal cells would most probably be located in the tip. Others think that there is some relationship between the localization of the tumor and the fact that the tip is the frequent site of an inflammatory process, especially of the obliterative type. However, these little tumors may occur at any point in the appendix. Undoubtedly many appear at the proximal end and are often disregarded because of the possibility of their extension from the cecum. Because of the various points at which the tumor may make its appearance, each examination of an appendix should include a splitting of the organ through its entire length and sections made from tip, center, and proximal end, for only by such a procedure can small tumors or foci of infection such as tuberculosis be detected. In Wilkie's¹⁷ case, there were two similar but independent tumors located at different points in the appendix with no connection between them. In some cases the presence of a tumor is suspected upon gross examination because of an enlargement or "bulbous" appearance of the tip, but more often the condition is visible only by the aid of the microscope. In the 22 cases studied at the Mayo Clinic,¹⁸ 5, or about 23 per cent. were large enough to attract attention upon gross examination. In a few rare instances the tumor is large and is seen to penetrate through the appendix, occasionally attaching itself to the surrounding intestinal coils. This behavior is usually that of the colloid or "gelatinous" type.

The microscopic picture of these carcinomata shows epithelial cells of various types arranged in various ways. The most common type is the so-called "spheroidal carcinoma" and consists of nests and masses of epithelial cells surrounded by connective tissue, which may be very small in amount or which may make up the greater part of the tumor. These epithelial cells are embryonic in type and so poorly differentiated that their epithelial derivation is not always certain. Mitotic figures are absent or found in very small numbers and no signs of active or recent growth are evident. The tumor usually underlies the mucosa, but may replace it. The cells infiltrate the muscular coat and in some instances only the serosa remains intact. Because of the masses of epithelial cells infiltrating and invading the various coats, this growth must be classified as a carcinoma, but the lack of mitotic figures and the intact serosa suggest a carcinoma of low grade malignancy, or a tumor which is, at least temporarily, "quiescent."

More rarely, instead of the masses of epithelial cells, there is an attempt at gland formation where perfect or partially developed glands are found in all the layers. But here, as in the "spheroidal" type, no very active signs of proliferation are present and one again has the impression of a very low grade malignancy. Occasionally, from the epithelial cells attempting to form glands, there is a large amount of gelatinous or colloid material. This type occasionally perforates and discharges a large amount of colloid material into the peritoneal cavity, or extends to neighboring coils of intestines or to other abdominal organs, as the ovaries. Very rarely, indeed, is seen yet another type consisting of the embryonic columnar type of cells, which are growing rapidly and are making a poor attempt at gland formation. These are infiltrating the various coats and contain many mitotic figures. Such a picture suggests at once a very malignant process quite analogous to the adeno-carcinoma frequently found elsewhere in the gastrointestinal tract.

It becomes quite apparent, then, that we have two very different types of carcinoma of the appendix: one, the "spheroidal" type, to which the majority belong and which is of doubtful malignancy, stationary as to growths, occurring comparatively early in life, and presenting a different structure from other gastrointestinal carcinomata; the other type, the adeno-carcinomata, which are rare and present a very different appearance from the spheroidal type. These resemble other gastrointestinal

carcinomata and show very obvious malignant characteristics with invasion into the surrounding structures; they occur later in life and may form metastases, thereby proving unmistakably their malignant nature. But the differentiation between the two types is frequently difficult, for, as in every branch of medicine, there are always border-line cases in which a dependable prognosis cannot be made. In such cases it is well to bear in mind that only a very small number will show malignant characteristics.

Almost all of the numerous writers emphasize the fact that carcinoma of the appendix is not malignant, for it usually does not penetrate the serosa, does not metastasize, and is cured by simple removal. In the majority of cases this statement is borne out by the "quiescent" histologic appearance. Because of their behavior, as well as histologic appearance, many authors object to calling them carcinomata at all, suggesting instead such terms as "carcinoid," "benign cancer," or "pseudo-carcinoma." Mallory¹⁷ points out their similarity to moles or nevi of the skin, which contain the same embryonic but quiescent cells, and considers them merely a congenital defect. Ashoff¹⁸ makes a similar observation and calls them "mucous membrane nevi." Others compare them to the epulis of the jaw or to the giant-cell tumors described by Bloodgood, which have a malignant appearance and yet are clinically benign in that they do not metastasize and are cured by removal. However, this similarity is in behavior but not in appearance. Warthin¹⁹ compares them in both appearance and behavior to the so-called basal cell carcinoma or rodent ulcer, which may appear upon the skin of the face comparatively early in life, growing very slowly and not metastasizing. These also contain masses of spindle-shaped, undifferentiated, epithelial cells surrounded by a varying amount of connective tissue and presenting a picture very similar to the "spheroidal" carcinoma of the appendix.

However, while one must admit that the majority of these carcinomata are benign from a clinical and histologic point of view, one must not forget that very malignant carcinomata of the appendix do occur and are described with metastases to other organs. Such cases have been described by Elting,² McWilliams,¹² Whipman,²⁰ White,²¹ La Comte,²² Geist,²³ Brunton and Glover,²⁴ Berger,²⁵ and Oberndorfer,²⁶ who reported two cases. Another case was described by Coley²⁷ in the discussion of La Comte's case. In 1882, Luce²⁸ collected twelve cases

of malignant appendiceal carcinoma, but of these he considered that in two the diagnosis was open to doubt. In all probability there are many others causing metastasis, but in the latter stages it is very difficult to locate definitely the primary growth, or to determine whether it is in the cecum or the appendix. In such cases where both are involved, since carcinoma of the cecum is a well established entity, the burden of proof lies with the appendix, and since unassailable verification is difficult to obtain, the case is often erroneously classified as primary carcinoma of the cecum. A careful follow-up system of operated cases that have left the hospital, as well as more complete autopsies, would doubtless demonstrate a larger number of malignant carcinomata of the appendix. At any rate, sufficient cases are already reported to make the malignant tumor of the appendix an entity which must be recognized.

It has been suggested by Elting² and Kennedy¹³ that the apparent absence of metastases in the majority of cases is due to the fact that the neoplasm simulating a foreign body, such as a concretion, produces symptoms leading to the removal of the organ before metastases have had time to occur. While this suggestion must be accepted as a possibility, it seems more reasonable to believe that, in the light of the histologic appearance of the majority of these tumors, they represent such a very low grade malignant process that they rarely metastasize. It is also a recognized fact that these neoplasms, many of them comparatively large, are found in appendices which have never given any symptoms but which have been removed at autopsies or during operations upon other organs. There is every reason to believe, then, that the absence of metastases is due to the inherent qualities of the growth and not to its early removal. This conclusion applies, however, only to the spheroidal type, while the adeno-carcinoma represents a very different problem. Ewing²⁹ recognizes two distinct types with entirely different manifestations of malignant characteristics.

The question of the etiology of these tumors, as in all neoplasms, has led to the advancement of many theories, none of which has been definitely accepted. The majority of observers attach great significance to the coexisting inflammatory process which is usually found. Luce²⁸ calls the condition "inflammatory pseudo-carcinoma" and considers it the product of a chronic hyperplastic inflammation with endothelial cells instead of epithelial cells.

Brewer³⁰ suggests that many so-called carcinomata arise at the site of a former perforation where part of the mucosa has become implanted in the muscle coat and simulates epithelial structures penetrating the muscularis. McKenty¹⁶ suggests that the formation of new connective tissue may cut off and isolate a few epithelial cells which later grow and form a tumor mass. McWilliams¹² and Wilkie³¹ feel that there is a possibility of the new growth stimulating the formation of connective tissue, thus making it a secondary process to the tumor formation. Belauf¹⁰ thinks the inflammatory process which is so common in all appendices has nothing whatever to do with the formation of carcinoma, but simply is the cause of the removal of the organ; thus bringing the pre-existing tumor to light. Harte⁴ believes that the inflammatory process, by changing the size and shape of the appendix, may dislodge any embryonal nests of cells which may be present and stimulate them to tumor formation.

Letulle and Weinberg³² pointed out that carcinoma usually arises in an obliterated appendix and in one of their cases were able to show the origin of the carcinoma at the very point where the lumen began to be obliterated. McCarthy and McGrath⁷ noted that 90 per cent of the carcinomata were found in obliterated appendices. In their later series⁸ a carcinoma was found in each 53 partially, or entirely, obliterated appendices. In our series from the Miller Hospital, 24 of the 276 appendices removed showed a partial or complete obliteration of the lumen, and as two cases of carcinoma were found one occurred in each 24 obliterated appendices. It seems then to be the consensus of opinion among writers that carcinoma of the appendix is usually associated with a chronic, and occasionally an acute, inflammatory process. They also feel that there must be a definite relationship between them because: (1) the carcinoma usually appears at the tip where the inflammatory process is most pronounced; (2) the carcinoma may arise at the point where the inflammation begins; (3) it usually occurs at an age when inflammatory processes are most prevalent, and (4) they are rarely found in autopsies.

Letulle and Weinberg³² point out the relationship existing between carcinoma and tuberculosis of the appendix. Kelly and Hurdon³³ mention the similarity in the appearance of the two and suggest the possibility of confusion of the two histologic pictures in that the isolated endothelioid cells in the hyperplastic type of tuberculosis might simulate

the epithelial cells of the carcinoma. Primrose³⁴ reported two cases of carcinoma in sisters having tuberculosis. These authors mention the relationship with tuberculosis not to prove an actual histologic relationship, but to emphasize the coexistence of a chronic inflammatory process, of which tuberculosis is an example, with carcinoma of the appendix.

The majority of carcinomata described in the literature were found in appendices removed because of symptoms of appendicitis. In none of the cases was there anything in either the type of symptoms or the history to suggest the presence of a tumor. Several gave a history of very severe attacks, but the greater number presented the symptoms usually associated with the so-called "chronic appendicitis." There was pain and tenderness, often associated with an increased temperature and leucocyte count with intermissions from time to time. In Weir's³⁵ case the appendix was removed only after the twelfth attack. As was mentioned above, the presence of a tumor was occasionally suspected at the time of operation, but usually it was discovered only by means of the microscope. This disproves the opinion, held alike by many surgeons and pathologists, that a gross examination, even by splitting the organ, is sufficient to determine whether or not a microscopic section should be made. Every appendix should be routinely sectioned at base, tip, and center, for only then can many cases of carcinoma and tuberculosis be found; on the other hand, only then can many large, thick-walled appendices be known to be due to, not tuberculosis or carcinomata, but chronic inflammation. Only by such work on the part of the pathologist can the best service be given alike to surgeon and patient.



Figure 1. Gross appearance of Case I and Case II.

The two cases from the Miller Hospital add very little to the subject from either a clinical or laboratory point of view.



Figure 2. Case I. Microscopic section showing gland structure in the submucosa.

CASE 1.—No. 3036, a male, aged 34. One month before admission to the hospital he had an attack of abdominal pain and tenderness lasting for three days. Two days before admission he had another attack similar in character but more severe. Rectal examination showed increased tenderness on the right side. Deep pressure elicited tenderness over the region of the appendix. At that time the urine was negative but the white count was 11,000. The x-ray diagnosis was "possible ilio-colic adhesion." He was admitted to the Miller Hospital on November 27, 1921, and the appendix removed by Dr. John Rogers on November 28, 1921. It was markedly enlarged with a very much thickened wall surrounding a large lumen filled with mucoïd material. Microscopic section showed a normal mucosa but under it were masses of epithelial cells forming glands, some of which were normal in appearance except that they lacked orderly arrangement and were found in the deeper layers, including the muscularis. These aberrant glands were lined by adult, well differentiated epithelium showing no evidence of recent proliferation. In such a case one might well consider the possibility already mentioned of an old healed perforation leading to misplaced gland acini. But under such conditions the glands would not have been so evenly distributed through all sides of the muscularis, and it is difficult to believe that a perforation could have taken place without the knowledge of the patient.

CASE 2.—No. 3333, a female, aged 25 years, gave no history of either past or present symptoms referable to the appendix, but consulted Dr. L. W. Barry because of a retroverted uterus with a rectocele and cystocele. She was admitted to the Miller Hospital on January 7, 1922, and on January 8, 1922, was operated upon for the pelvic condition, the appendix being removed at the same time. It was slightly smaller than usual with a distinctly dilated,

bulbous tip. Gross section of this showed no lumen, but the entire end consisted of homogeneous, firm, white tissue. Microscopic section showed the only remaining intact coat to be the serosa, while the others were replaced by masses of poorly differentiated, embryonic, atypical, epithelial cells surrounded by a small amount of connective tissue. No mitotic figures were found. This was a typical example of the "spheroidal" type. This tumor was very easily seen upon gross examination and represented a marked enlargement of the tip, yet no symptoms were present. This, then, seems to disprove the theory advanced above that the tumor growth, when reaching a definite size, acts like a foreign body or concretion producing symptoms of appendicitis which prompts the removal of the offending organ before perforation or metastasis might appear. While disproving this theory it strengthens the assumption that there are two definite types of carcinoma of the appendix, one of which is benign.

To summarize these benign tumors, the so-called "spheroidal type" occurs in the years of early maturity before the usual appearance of malignant tumors; these tumors present no distinctive symptoms and show a histologic picture very different from the carcinomata usually found in the other parts of the gastrointestinal tract in that they lack many of the malignant characteristics, such as mitotic figures. Furthermore, the old adage of "The younger the patient the more malignant the tumor" is not applicable here. It also seems probable that the cause for its appearance is no more clear than in those occurring in other parts of the body. Chronic inflammation, while usually present

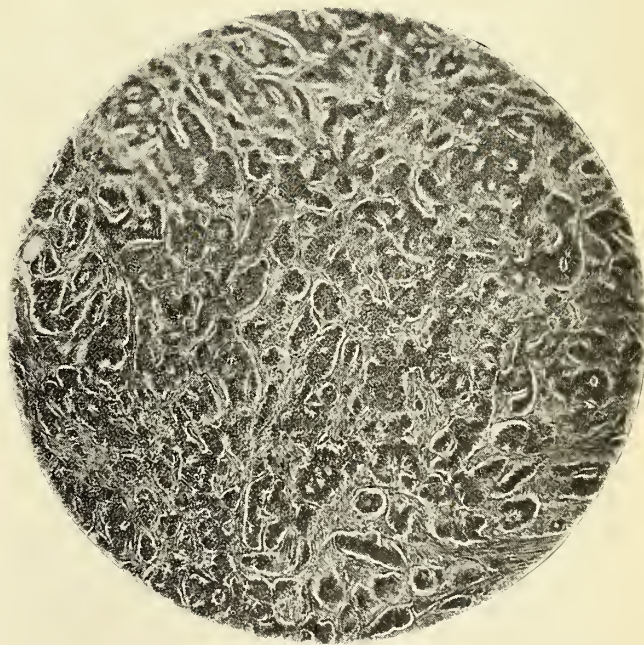


Figure 3. Microscopic section of Case II showing the typical "spheroidal" appearance.

with the tumor, plays a very unimportant rôle and is simply the cause of the removal of the appendix in which the tumor happens to be located. The finding of such a large number during the earlier years of life merely means that more appendices are removed during that time. It seems very possible that these tumors may remain stationary for years, just as a mole on the skin will, and would be found at any age that the organ might be removed.

However, the frequent appearance of these tumors with their undoubted benign character should not lead to the assumption that true malignant tumors may not also occur at the same site; nor should it lead one to assume that all appendiceal carcinomata are benign. But one must be prepared to meet and recognize two distinct types of carcinomata of the appendix.

This subject can be further clarified by a closer observation of patients after leaving the hospital and a checking of their subsequent health with the microscopic findings obtained. Only by such close observation and by close co-operation between the clinician and pathologist can there be an explanation and elucidation of many of the obscure phases and apparent discrepancies in the science of medicine.

CONCLUSIONS

1. In the routine sectioning of all appendices removed at operation carcinomata are found in from .2 to .3 per cent.

2. Two definite types occur: the spheroidal or benign, and the adenocarcinoma or malignant type.

3. While these two types present a different histologic picture, there are gradations from one to the other, making the differentiation between the two types often impossible.

4. Chronic inflammation, while usually coexistent with the tumor, plays an unimportant rôle as an etiologic factor.

5. Every appendix should be sectioned and when a carcinoma is present the patient's later health should be carefully watched from the viewpoint of the possible appearance of metastases.

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PROGRESS IN CANCER RESEARCH*

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The idea that the body as a whole rather than its individual cells should be held responsible for the development of cancer, is as old as the hills; it is the biochemical conception of malignancy. Perhaps no other conception in medicine has been quite so often ridiculed, seemingly killed and successfully buried. Few other conceptions have managed as successfully to survive in spite of apparent annihilation from 300 B. C. to 1922 A. D. As a rule, the persistent reappearance of an idea signifies that it embodies some fundamental truth; witness aviation. The old Greeks believed that human beings would fly like birds; Roger Bacon, an English monk, wrote a surprisingly modern description of an aeroplane in 1210; Leonardo da Vinci made a model of a flying machine in the beginning of 1500; and aviation helped to win the war (1914-1918).

Nothing is more interesting than to trace the development and the materialization of an idea through history. Nothing is more readily conceded, more cheerfully forgotten, and less fully realized than the part played by scientific tools in the progress of science. Fundamental principles have always been grasped by the human mind long before they could be demonstrated; but theories remained theories only, until the mechanical devices were available by which they could be transformed into visible or tangible fact. The history of the biochemical conception of malignant growth is no exception to this general rule.

A very brief summary of the development of the biochemical conception of cancer is of practical interest, not only because modern cancer research is progressing along chemical lines, chemistry today being equipped with the apparatus needed for its work, but because there is evidence that chemical considerations will be of real, practical value to cancer patients.

The history of the biochemical conception of malignancy may be divided into four periods. These periods have been named after four supposed causes of cancer, namely, the black bile, the lymph, the blastema, or cancer bud, and diathesis,

or metabolic mismanagement. Each period gave rise to delightfully weird and fantastic theories, and to many even more weird and startling methods of treatment.

Period I. The period of the atra bilis (black bile) theories 300 B. C.-1650 A. D.
Period II. The period of the lymph theories....1650-1800
Period III. The period of the blastema (cancer bud) theories 1800-1850
Period IV. The period of the diathesis (metabolic mismanagement) theories 1850-19—

During the first period (300 B. C. to 1650 A. D.), the black bile, assumed to be manufactured by the spleen, was universally blamed for the development of tumors, and the tumors were regarded as something foreign to the organism (*praeter naturam*). A serious difficulty developed, however, after the numerous wars of the fourteenth, fifteenth, and sixteenth centuries had helped to develop the science of anatomy; the black bile could not be found anywhere in the body. The blood, on the other hand, appeared to be everywhere. So, for a time, between 1300 and 1500, the blood was considered to be the cause of cancer, especially when it acquired the somewhat mysterious qualities of "melancholy blood." The physician's chief object was to get rid of this melancholy blood by therapeutic measures such as the "resin of gold" and a preparation of fish-spawn (both prescribed by Paracelsus); the surgeon was told to "be sure and bleed the patient white," when dealing with malignancy. One cannot help imagining the face of a modern surgeon at the bare suggestion. But, if the blood was plentiful and easily observed, it did not yield much information concerning malignant growth. There were neither instruments nor methods with which to study it. Chemistry was still pure alchemy, busily engaged in looking for the elixir of life and the philosopher's stone, which would turn baser metals into gold; it had neither time nor inclination to worry about the peculiarities of melancholy blood. Interest in the blood as a factor in malignancy subsided, became comatose, so to speak; it did not die outright, for during the following centuries prominent men wrote on the subject at intervals.

The second period (1650-1800) deserves the name of, Period of the lymph theories. The blood had proved to be a disappointment as far as the etiology of malignant growth was concerned. The lymph came to be the center of attention through two of the great discoveries of the seventeenth century—the discovery of the circulation by Harvey

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(1628) and of the red blood corpuscles by Malpighi (1661). It was Leeuwenhoek's first, very primitive microscope which disclosed to Malpighi that the blood was not a homogeneous fluid, as it was supposed to be, but that it consisted of cells floating in a colorless liquid, which was referred to as lymph during the seventeenth and eighteenth centuries, and which modern science calls blood serum or plasma. It is an interesting coincidence that the microscope, the instrument which revealed the smallest anatomical units known at that time, came from Holland, one of the smallest countries in the world.

The lymph, being a new discovery, was immediately accused of causing cancer, and three theories were developed in the attempt to prove it guilty. These theories were formulated by eminent scientists in three countries—by Descartes in France, Hunter in England, and Lobstein in Germany. Each theory represents a new phase in the evolution of the biochemical conception of malignancy.

Descartes (1590-1632), the originator of the first lymph theory, assumed the lymph to be a liquid that merely happened to be in the body, but of which the chemical properties, acidity, alkalinity, fermentation, and coagulation are important. Hunter (1723-1793), whose name is associated with the second lymph theory, realized that the lymph is an integral part of the blood and he studied the physical factors by which the quality of the lymph might be altered. The scientific vision of Hunter, to whom the cellular structure of tissues was unknown, is shown by his definition of malignancy: "Tumors are formed by the activities of the organism in which they develop, they are comparable to normal tissues, they live and grow through being nourished by the body itself";¹⁷ a modern pathologist, equipped with a Zeiss microscope, histologic staining methods, and a knowledge of biochemistry could not have given a more accurate definition. Lobstein (— 1840), after whom the third lymph theory has been named, was a professor of Strassburg University and a profligate genius; his morals were such as to offend even his contemporaries during the very broad-minded eighteenth century; he was banished and died in poverty in New York. His theory suggests that the lymph has "formative properties," being composed of "plastic molecules," and connects its physiologic activities with the formation of the blood clot, which he regarded as the first stage of malignancy, the cancer bud or blastema.

The therapeutic measures employed against malignancy from 1600 to 1800 range from medieval blood-letting to surprisingly advanced surgery; from the intelligent use of cautery and caustics to the application of the famous "red paste," composed of unsalted butter, gentian root, red bolus, white wax, frogs' eggs and "white vitriol" (1764). Violent purgatives played a prominent part, of course, but dietary measures, which might be called almost modern, were also advocated. Two remedies, which gained great popularity, were so startling as to deserve special mention—the daily intake of soap emulsified in milk (Dupre de l'Isle, 1774), and the ingestion of live lizards, recommended by Gourlay. A special variety of gray lizard alone was considered beneficial. The heads and the tails of the reptiles were cut off and the bodies had to be swallowed "still squirming." Recamier (1756-1856), an eminent French physician and an excellent observer, reports good results from this treatment. Bayle and Cayol, however, who made the official report on cancer for the University of Paris, failed to observe any improvement, even after one unfortunate patient had been made to devour as many as 400 lizards. The official report is dated 1810. A century later (1912), a substance called bufonin was isolated from the skins of toads and lizards; it has digitalis-like properties. The beneficial effects of the lizard diet, when any occurred, may therefore be connected with a cathartic action and perhaps with an activation of certain metabolic functions in patients whose bodies were still capable of responding; for rises of temperature, diarrhea, vomiting, and sweating were the symptoms obtained by Baldini, who tried the remedy on himself.

During the third period (1800-1850), the period of the blastema, three important factors co-operated to bring about the apparently final defeat of the biochemical conception of malignant growth, namely, Chevalier's achromatic microscope, by which the cellular structure of plant and animal tissues was revealed; the discovery of histologic staining methods making visible undreamt of details in the cell and its nucleus; and the birth of cellular pathology. As cellular pathology was equipped with the instruments by which its contentions could be demonstrated, it dominated cancer research well nigh until the present day. The defenders of the biochemical conception of cancer had no means as yet by which their theories could be crystallized into proof; their ideas failed to carry conviction.

The study of the lymph had done little to solve the problem of malignant growth; but it had called attention to the blood clot. Improved methods of investigation proved that in malignant conditions coagulated blood often contains tumor cells; small wonder if the blood clot was acclaimed to be the "cancer bud," the primary etiologic factor in malignancy. Even Virchow defended this conception as late as 1847, after finding malignant thrombi in the iliac veins of patients with carcinoma.

The history of the fourth period (1850 to the present day), the period of the diathesis theories, shows that the eradication of the biochemical conception of cancer by the progress of cellular pathology was not as complete as it was thought to be at first. The term diathesis is used in connection with this era of cancer research in its broadest acceptance, as synonymous with metabolic disturbances or faulty body chemistry. The theories dealing with diathesis, in this acceptance, are so numerous that it would be impossible even to mention them all in a brief survey; they embrace everything in creation, from tomatoes to combustion products, from racial characteristics to the ingestion of shellfish, from climatic conditions to industrial poisons, from the lack or the excess of sodium chlorid in the food to the influence of heredity, from the consumption of meat or cider to the influence of trees, the water, or the soil. Not a few of these theories have been the object of extensive investigations by recognized authorities in all countries, only to sink into complete oblivion. They may be classified conveniently under the following seven headings: predisposition, specific cancer toxins, enzyme activity, composition of the diet, specific chemical factors, chemistry of the blood, and anomalies of endocrine function.

Modern research, especially the work of Slye in Chicago, on the effect of selective breeding in mice, shows that predisposition is but another name for the heredity factor, of which the influence is tacitly admitted today by the registration of pedigree stock. The specific cancer toxins have proved to be as elusive as the black bile. The influence of enzymes on malignant growth may prove to be a factor of importance, as shown by the recent investigations of Falk. The composition of the diet promises to be of practical importance and capable of benefiting the cancer patient. The influence of specific chemical factors (anilin, arsenic, coal derivatives, benzol and others),^{5, 6, 10, 11} the chemistry of the blood, and endocrine anomalies represent an

immense field of research, still largely unexplored, but in which the key to the cancer problem will doubtless be found.

The importance of the chemical composition of the blood can hardly be questioned if it is recalled that the life of every cell in the body depends on the blood supply. The blood is practically the only food to which the cells have access, and the quality of the food is likely to affect the cells at least as much as it does the temper of human beings; a good dinner is known to put everybody in an amiable frame of mind, a bad dinner has the opposite effect, as a rule.

The practical value of blood chemistry is illustrated by the recent investigations of Killian and Kast, at the New York Postgraduate Medical School and Hospital; they found a surprisingly early increase of uric acid in the blood in malignant conditions. It was proved that neither the age of the patient nor the reabsorption of tumor proteins explained the high uric acid values; for removal of the tumor does not reduce the values when the prognosis is unfavorable and the blood of a young woman with a rapidly growing cancer of the breast had a very high uric acid content, although the patient showed none of the symptoms that suggest lesions of the kidney, such as albuminuria, retinitis or a high blood-pressure. Killian and Kast rightly conclude that the high uric acid content of the blood is evidence that the kidneys are being overworked, presumably in their attempt to eliminate the products of fundamental, though unknown, metabolic disturbances. Under these conditions, it is obvious that measures calculated to lighten the task of the kidneys will improve the fighting chances of the patient.

A recent editorial in the Journal of the American Medical Association calls attention to the importance of cholesterol metabolism. Cholesterol is one of the blood lipoids, found in every type of blood. In malignancy, the blood cholesterol values tend to be high and there is also other evidence of a mismanagement of cholesterol metabolism.⁹ The test for cholesterol is not a diagnostic test, but its technic is simple, although the interpretation of the findings is not always easy, as many factors have to be taken into account. The determination of uric acid in the blood is a more complicated chemical procedure; an admirable test for early renal insufficiency was published later by Magath.

The busy practitioner, however, has neither time nor equipment for the study of blood chemistry,

as a rule and laboratories are not always within reach. Nevertheless, he too has means at his disposal to assist an overburdened kidney. There are many time-honored and valuable measures by which renal function can be supported, measures which are not necessarily drastic, but based on common sense and applicable everywhere, such as reduction of the intake of meat, an increase of the liquid intake, especially in the form of milk,* a largely vegetarian diet with plenty of cooked or raw fruit, and careful attention to the daily, complete evacuation of the colon, for which simple water enemas and Nujol (liquid petrolatum) are useful. Such measures, moreover, are well calculated to facilitate the task of both cholesterol and uric acid metabolism. It is possible to reduce the cholesterol content of the blood by regulating the diet as I have shown.⁸ Eggs have a very high cholesterol value and should be used only occasionally. Oatmeal (porridge) appears to increase the cholesterol value for reasons that are not fully explained; it is safe to avoid it or to limit its intake. The value of dietary measures in gout, in which an excess of uric acid plays so prominent a part, is too well known to require comment. The slogan of modern cancer research is likely to become "To benefit the patient, help the kidney."

There is another fact to which I want to call your attention; it represents a message of good cheer for our cancer patients. Rohdenburg's data in the *American Journal of Cancer Research* prove that in at least 100 well-authenticated, inoperable, and apparently hopeless cases of cancer (microscopic diagnosis), spontaneous and complete regression of the tumors occurred. The patients became clinically well, although none of them had been treated by radiotherapy. One of these patients, a man with a large carcinoma involving the tongue, the tonsils, and the palate, was sent home with the doctor's blessing and a mouthwash. No mouthwash ever cured a cancer, yet examination eighteen months later proved that the tumor had completely disappeared, and the man felt well.

A statistical study with clinical data and histologic findings on 200 resected portions of the stomach by MacCarty and Mahle, furnishes evidence that in gastric cancer 6 per cent of the patients "without glandular involvement lived over

ten years" and 1 per cent even for "thirteen years after operation." Two patients in this series, one of whom (2811, Group 2) had "some glandular involvement" and another (9723, Group 3) in whom "all the glands were involved," had lived for thirteen years when the statistics were compiled (1921).

In a recent issue of the *Medical Record*, Bell, superintendent of cancer research at the Battersea General Hospital in London, who was an "operating surgeon for fifteen years" and whose observations on malignancy cover a period of twenty-seven years, gives very interesting details concerning four patients, all of whom suffered from apparently hopeless, malignant conditions. These patients also became clinically well and able to carry on their work. Bell regulated their diet, prescribed water enemas, and gave such organotherapy as seemed indicated.

Facts like these are proof positive that the human body can hold its own against malignant disease to an extent which is not generally appreciated. If some of these patients won the battle against overwhelming odds, as shown by Rohdenburg's data, many more might be able to do so with the right kind of assistance. From the patient's point of view, "being clinically well" is the chief consideration. How these patients got well is for modern cancer research to discover. The problem will be solved by chemical investigation, because it is a chemical problem and because chemistry today is equipped with instruments and methods as it never was before.

Early diagnosis and early treatment, needless to say, are of primary importance. It will not harm any patient, however, to facilitate the chemical tasks of his body by regulating his diet, either before or after operation or when operation proves to be impossible. Nor will any harm result from telling the victims of malignant disease that at least one hundred fellow sufferers, who apparently had no chance of recovery, have managed "to fool their doctors by getting well," and that they have just as good a chance to "go and do likewise." On the contrary, if psychic impressions influence the body chemistry, as we know they do (the work of Carlson shows, for example, that fright inhibits digestion, and we are all familiar with the type of indigestion produced by bad news received after a hearty meal), then mentioning the foregoing facts will certainly not lessen a patient's chances and may possibly better them.

*For patients who do not like or cannot handle milk, Ovaltine (Wander Company, Chicago) is a useful substitute. It is a kind of "glorified" malted milk with a high nutritive value, flavored with cocoa, containing egg-lecithin, but no cholesterol, as I proved by determination. It is not expensive, easily prepared and keeps indefinitely.

SUMMARY

1. The history of cancer research shows that the formerly much derided biochemical conception of malignant growth has not only survived through twenty-four centuries, but that it is gaining ground today because instruments and methods for chemical investigations are available.

2. The practical value of researches along chemical lines in malignancy has been demonstrated by recent investigations.

3. The complexity of metabolic functions and the number of organs concerned in their regulation make it seem improbable that any single cause of or cure for malignancy is likely to be discovered.

4. The very multiplicity of the factors underlying malignant growth warrants, however, that the consideration of all factors which tend to disturb metabolic processes in the body, that is, chemical processes, will prove of benefit to the victim of malignant disease.

5. The complete and spontaneous regression of inoperable, malignant tumors in 100 well-authenticated cases is conclusive evidence that the human body can wage a winning fight against malignancy.

6. The knowledge that other patients have become clinically well, although the odds seemed entirely against them, can do no harm to any patient suffering from a malignant condition and may prove beneficial to him.

7. Early diagnosis and early treatment of malignancy are of primary importance, but the regulation of the diet is of value, also, because it facilitates the chemical tasks of the body.

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NON-SURGICAL DRAINAGE OF THE BILIARY TRACT: A FEW CLINICAL EXPERIENCES*

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Since Meltzer¹ wrote his little footnote in 1917 describing the action of magnesium sulphate on the duodenobiliary reflex, and suggested a therapeutic and diagnostic application, many prominent clinicians have utilized this procedure as an aid in diagnosis and treatment. Einhorn² invented the duodenal tube and was one of the first to analyze duodenal secretion. Rehfuß³ modified and improved the duodenal tube. Lyon⁴ developed a method of procedure, the technique of which is generally followed by other investigators and clinicians. Lyon and Smithies⁵ are enthusiastic supporters of the A, B, C bile segregation as indicating definite portions of the biliary tract drained. White,⁶ Cheney,⁷ Crohn, Reiss and Radin⁸ and others, have been skeptical as to the source of the B bile and the conclusions drawn from its analysis.

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Thus a spirit of honest investigation has been stimulated among clinicians and workers in research.

During the past two years, 240 drainages have been performed at the Mankato Clinic. This series was done on over 100 patients. Twenty-five of these cases came to operation or had been operated previous to drainage. Forty other cases had clinical symptoms of biliary tract disease. Six were diabetics. Four cases had acute infectious jaundice. The others were drained in the course of general examination and treatment for various diseases.

METHOD OF PROCEDURE

The method described by Lyon was followed in the main. The passing of the duodenal tube is a simple procedure, if properly carried out. In over 80 per cent of our cases, the tube was passed into the duodenum in an hour or less. The careful and time-consuming preliminary cleansing of mouth, pharynx, and stomach is, in our opinion, futile. A short washing of the mouth with alkaline antiseptic solution, a brief lavage of the stomach after the fastening contents have been aspirated, and a sterile duodenal tube is all that is necessary in the preliminary steps. The accessory sinuses, the mouth and teeth, the folds of the mucous membrane of the esophagus and stomach can never be completely freed from their secretions and flora by any amount of washing. For the proper performance of the drainage there should always be a preceding complete twelve-hour fast, otherwise food debris and interrupted physiological functions of the tract studied will interfere with proper interpretation of findings.

FACTORS WHICH INTERFERE WITH FINDINGS

If the biliary tract secretion alone could be secured, the study of the bile would be simplified greatly. Unfortunately, this is not the situation. Bacteria, mucus, pus, blood, and cells are carried into the stomach, and consequently into the duodenum, from the entire respiratory tract and the accessory sinuses. In the stomach itself, hyperperistalsis, hypersecretion, hyperacidity, and the opposite conditions greatly modify the quantity and character of the fluid aspirated from the duodenum. Infection of the stomach wall itself must be considered. In the so-called "bilious" cases, there is often an active reverse peristalsis of the duodenum and proximal portion of the jejunum with regurgitation of secretions into the stomach. We have actually observed this phenomenon under the fluoroscope, by injecting a small quantity of barium through the tube with the bulb in the last part of the duodenum or the first part of the jejunum.

In one case of complete obstruction of the common duct by a calculus, found at operation, we secured as much secretion from the duodenum as if the bile were flowing freely. The flow of pancreatic secretion is another disturbing factor. All these things must be kept in mind when analysis of the duodenal aspirate is made. For this reason, in studying our cases, we have examined the fasting stomach content and tabulated the findings parallel to, and in the same way as, the duodenal examination. There is, of course, the usual titration for acidity of the stomach content, and we have included that factor in the comparison. Time and rather inadequate facilities have prevented us from making bacterial cultures in many cases. Those studied show such a preponderance of bacillus coli that further examinations were abandoned. Undoubtedly, cultural methods should be employed before proper interpretation can be fully given.

DIAGNOSTIC AND THERAPEUTIC RESULTS

In making this report on diagnosis, we shall take only some cases which came to operation. Comparison will be made between the findings in the fasting stomach content and the aspirated bile, as to mucus, pus cells, blood, and bacteria. An increase of these factors in the duodenal aspirate has, in our estimation, a definite significance. The type and number of crystals have also been observed.

In eight cases of cholelithiasis, five had increase in mucus; four, increase in pus cells; one, increase in blood cells; six, increase in bacteria, most of them with additional kind of bacteria as compared with those found in the stomach content. Four cases showed cholesterol crystals. One case showed calcium phosphate crystals. Six cases had dark B bile. Two had foul smelling, thick, purulent bile. Six cases had had biliary colic. The fasting stomach content in seven cases showed the presence of free HCl, ranging from 12 to 28; all cases showed total acidity ranging from 18 to 55. Three cases had jaundice. It is interesting to note that the cholelithiasis cases showed a much higher gastric acidity than the cholecystitis cases. Only about 50 per cent of the above cases showed definite evidence of biliary tract disease in the biliary analysis.

In ten cases of cholecystitis, preoperative drainage in six cases showed increase in mucus, nine cases increase in pus cells, two cases showed presence of blood; all ten cases showed a very definite and marked increase in bacteria and variations in kind of bacteria. All cases showed dark, thick, opaque B bile. Only six cases showed precipita-

tion of cholesterin crystals. In the fasting stomach content, eight cases had no free HCl. (The other two cases had very extensive adhesions about the gall-bladder.) One case had no total acidity; the others ranged from 8 to 55. Five cases showed the presence of streptococci in the duodenal aspirate but not in the gastric content. In 100 per cent of this series, definite evidence of biliary tract pathology was revealed by duodenal analysis.

In twelve cases in whom the gall-bladder had been removed, only six produced the dark B bile, and most of these had been operated more than a year previously. All of the cases of diabetes mellitus, except one, showed no free HCl in the gastric secretion and all showed the presence of abundant streptococci. One case of pancreatic diabetes complicating cholelithiasis showed a brilliant and remarkable result following three drainages. The jaundice and glycosuria promptly disappeared and the patient was successfully operated upon for the cholelithiasis.

The clinical cases of biliary tract disease showed varying findings, but most of them corresponded well with the cases of cholecystitis above mentioned. One case of *lamblia intestinalis* was discovered in the series. There was gastric anacidity and the duodenal fluid was swarming with the flagellate parasites.

Therapeutically, we have found that a great many cases are relieved of their symptoms after from one to five or six drainages. Those in whom there was a recurrence of symptoms following cholecystectomy seem to have gotten the most marked relief. Time and space does not permit us to dwell longer on these cases. The purpose of this paper is to present a few brief facts concerning proven cases of biliary tract disease. One other group of cases should be mentioned and that is the cases of acute infective jaundice. The four cases treated by this method seemed to be much relieved from their symptoms, and the course of the disease shortened.

COMMENTS

From the above findings, we believe that the analysis of the aspirated bile when compared with stomach findings gives very definite evidence of infections of the biliary tract. The claim that it is possible to determine what portion of the tract is diseased seems to us rather far-fetched, and untenable. Our series shows the best diagnostic results in the cholecystitis and cholangitis cases, and rather disappointing results in the cholelithiasis cases. The finding of pus, blood, and abundant

bacteria in the aspirated bile only, is undoubtedly of great diagnostic value with regard to general biliary tract infection, and we must be wary in carrying the differentiation any farther. The presence of free HCl in the stomach content seems to have an inhibiting effect on the quantity and character of the duodenal flora. The varying of the quantity of gastric juice secreted and expelled into the duodenum has a great bearing upon the density of the bile in the aspirate. We have found, during a single drainage, the specific gravity vary from 1008 to 1020. This, it would seem, should render an attempt to analyze the bile pigments, as some have attempted to do, a very uncertain and unsatisfactory procedure. It should be noted, also, that negative biliary findings do not always indicate absence of disease in the biliary tract.

As a therapeutic measure, it promises much, and we shall continue its use with much confidence in its beneficial results. It is encouraging to note that such surgeons as Willy Meyer,⁹ and such modern works as the Oxford Medicine, dwell upon the great possibilities in this procedure, both from a diagnostic and therapeutic standpoint.

It is hoped that more general practitioners and clinicians associated in small group practice will utilize this method and report their results, as it is thus that the real worth of the procedure may be established. The procedure is fairly simple and is within the ability of any progressive physician.

There is one possibility which has not yet been fully utilized. I have not seen it discussed except in one article, that by Aaron, Beck, and Schneider.¹⁰ It is the test of liver function by means of the intravenous injection of a solution of phenol-tetrachlorophthalein. The test was originally done by Abel and Rowntree,¹¹ but the collection and examination of feces is such an arduous and unpleasant task that it has not come into any general use. This test could be combined with duodenal drainage and the results very easily and quickly calculated, and thus another valuable test added to our growing list of functional diagnostic tests.

CONCLUSION

1. The Lyon-Meltzer method of duodeno-biliary drainage is of definite diagnostic value in infections of the biliary tract. It is believed that proper comparison should be made with contents of the fasting stomach. Cholecystitis and cholangitis present the clearest diagnostic picture.

2. As a therapeutic measure, it is of distinct value in early stages of biliary tract infections, and postoperative treatment after cholecystectomy.

3. As a diagnostic measure, its possibilities have not been fully developed or revealed. A more general employment of the procedure by the profession at large and a more thorough research by laboratory workers is necessary to establish its proper value.

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OTOLARYNGOLOGY AND THE GENERAL PRACTITIONER*

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Much of the progress that has been made in the science of medicine in recent years has been the result of the work of those who are restricting their practice to more or less circumscribed special fields. The result has been that many of the facts that have in this way been added to our store of knowledge come clothed in more or less technical language that may be anything but elucidating to the man in the practice of general medicine. A knowledge of these facts, however, continues to be of great importance to the general practitioner. To assume that the general practitioner must relegate all work in the special fields to the specialist would logically lead to the retirement of the general physician for the simple reason that all phases of medicine have now become, strictly speaking, fields of work for those who choose to specialize along some particular line. That the elimination of the general practitioner is not the goal towards which we should be working is, I believe, clear to all of us. No less an authority on medical problems than

Dr. Frank Billings holds that fully 85 per cent of all physical ailments fall within the scope of work which the general practitioner can and should take care of.

Undergraduate medical teaching is coming more and more to be conducted by men specializing in some particular field. This fact does not, I trust, and, of course, should not mean a tendency in our medical schools to turn out men prepared to be specialists. The one aim of undergraduate medical teaching should continue to be to prepare men for general practice. The relegation of the instruction in the various fields to specialists in these subjects is simply a recognition of the plain fact that the problems in these fields can be better presented by the specialist. The method of conducting undergraduate instruction is undergoing great changes. The old-time arena clinic for presenting operative work, whether this be in the older recognized specialties such as ophthalmology and otolaryngology or what we still term the field of general surgery, is being for the most part replaced by instruction in diagnosis and the discussion of problems encountered in these special fields. The teaching of operative technique should properly form a part of the graduate instruction for those who are preparing to practice in some special field. This applies as much to the field of general surgery as to the older specialties. As a matter of fact, the man who has completed his undergraduate medical course is no more prepared to do general surgery than he should be to handle the technique of operations in the so-called surgical specialties. To teach operative technique in special fields to undergraduate medical students or to graduates of medicine engaged in general practice, men who lack the training in the more difficult and much more important problems of examination and diagnosis, is only preparing men for indiscriminate harmful surgery. It should be remembered that it is a relatively simple matter to teach men the technique of an operation; whereas it is much more difficult to train them to recognize the proper indications for doing the operation.

With these few preliminary remarks, I shall undertake to point out a few of the problems in otolaryngology with which the general practitioner should be conversant. Beginning with the ear, the problems relating to the defects in hearing as well as those concerned with vertigo resulting from disturbances of the vestibular mechanism must be turned over to the care of those trained in the technique of functional testing; that is, to men who are specializing in otology. It is with the problems

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in suppurative disease of the ear, especially, that the general practitioner should be conversant. Cases of acute otitis media often pass unrecognized because there is little or no complaint of the most conspicuous symptom of this malady, namely, earache. This may occur in adults, but it is especially true in children who are either too young to complain of the pain in the ear or not yet old enough to call attention to such symptoms as the sensation of fullness, when this occurs without acute pain. Now, the most important service rendered in the treatment of acute otitis media is the securing of early drainage through an opening in the drum membrane. When this occurs spontaneously, it is usually quite as satisfactory as when the membrane is incised. The important thing is that the drainage be established as early as possible, for it has become a generally recognized fact that delay in establishing the discharge even for a few days is a common cause for disintegration of bone in the mastoid process, necessitating surgical interference.

There are a few facts in connection with an acute mastoiditis that every general practitioner should understand. One is that an involvement of the pneumatic cells of the mastoid process is the rule rather than the exception in cases of acute otitis media. Many of these cases present no characteristic mastoid symptoms when the skiagraph will show the presence of pus in the cells. Another point of great importance is that the recognition of mastoiditis either by means of the skiagraph or by the presence of pain and tenderness over the process is not in itself an indication for surgical interference, especially during the first week of the otitis media. When there is an absence of high temperature or of persisting severe pain, it is much better to refrain from operation, even when it is perfectly clear that a mastoiditis exists, for two reasons: first, in most of these cases the process will heal spontaneously, and second, after a softening of the process takes place, that is, after the lapse of two or three weeks, there is much less likely to develop a postoperative extension requiring subsequent operating, than when the operation is undertaken before an abscess cavity has formed, and the infection has become thoroughly walled off from the neighboring bone. The indication to operate during the first week or two of an otitis media rarely arises.

In cases of chronic suppurative otitis media, the problem of determining when local treatment is called for or when an operation should be recom-

mended is now a very definite one, and the decision is one which every thoroughly trained otologist has no difficulty as a rule in reaching. The fact should always be kept in mind that most cases of chronic suppurative otitis media are practically harmless affairs as far as the risk of a serious complication is concerned. Such cases do not warrant operative treatment. It is the exceptional case in which there lurks the danger of a serious complication, such as extension to the labyrinth, sinus thrombosis, meningitis or brain abscess. How can this diagnosis be made? It hinges on one condition, namely, whether the disease involves only the mucous membranes lining the middle ear cavities or whether there is added to this a bone invading process. It is only in the latter that an indication for operative treatment exists, for the simple reason that it is only in these cases that there is danger of a serious complication. No one is justified in advising radical surgical treatment for the cure of a chronic discharge from the middle ear, when it is clear that the process does not involve the bone. A well-trained otologist has very little difficulty in determining when the process is one that is invading the bone. The diagnosis is based on the character of the discharge, the location of the perforation in the drum membrane and the evidence of a cholesteatoma. An offensive discharge uninfluenced by local cleansing treatment, a marginal perforation occupying the upper posterior segment or the region of Shrapnel's membrane, and evidences of a cholesteatoma all point clearly to a bone-invading disease. Not even all of these cases call for operative treatment, but it is only among this type that cases exist where surgery is justified.

I want to say a few things about nasal conditions. I am of the belief that there is no part of the human body which is being subjected to more unnecessary surgical procedures today than is the nose. The reason for this state of affairs is very clear. Men prepared to do general practice have been in the habit of coming to our clinics in the cities, remaining long enough to get a smattering of knowledge of the technique of a few intra-nasal operations, notably the operation for the correction of anatomical variations in the nasal septum, operations on the turbinal bodies, including operations on the ethmoid labyrinth, but these men are not willing to spend the months and months of careful work necessary to gain an appreciation of the proper indications for these operations. It is because I am witnessing every day the harmful effect of these unnecessary operations, especially on the nose, that

I insist that we have no right to teach internes in our general hospitals or general practitioners the technique of operations in any special field, unless they have spent the time and study necessary for acquiring ability to recognize indications for these operations. Take for example the question of the nasal septum. It is the rule for this structure to be more or less irregular, but it is the exception when this irregularity requires correction. In general, it is only when the deflected septum interferes with nasal respiration to such an extent that the patient himself is conscious of the fact or when the presence of the deflection interferes with the proper drainage of an infected sinus that its correction is called for. The idea that the so-called spurs of the septum cause headache has been shown to be a myth, as has been the idea that an irregularity of the nasal septum has anything to do with middle ear disease.

More harmful than this work on the nasal septum is the unwarranted operations for the relief of imaginary accessory sinus diseases. Too often we see a diagnosis of a supposed obscure accessory sinus disease based on such a symptom as a persisting headache, without any corroboration by the accurate methods of examination known to the well-trained rhinologist. Now, headache is a common symptom of accessory sinus disease, but, as a matter of fact, for every case of headache that is caused by this sort of trouble there are perhaps at least ten cases where a persisting headache has nothing to do with sinus disease. The untrained man who acquired a smattering of technique for a few intranasal operations, but knows little or nothing of the diagnosis of sinus disease, is doing an infinite amount of harm by subjecting patients to unwarranted operations on the nose in the hope of curing headache which is not due to any nasal condition.

I must not close this discussion without referring briefly to the problem of the faucial tonsils. I want to make one exception to the statement just made that the nose is being subjected to more unwarranted surgical procedures than any other part of the human body. This exception is the faucial tonsil. I am convinced that the problem of determining when the tonsils are a menace and should therefore be removed is not so simple as it is generally supposed to be. I should like to close by making a brief statement of what conditions constitute proper indications for the removal of these much abused structures. In the first place, all of us recognize that tonsils which are the seat of

recurring attacks of acute inflammation are a sufficient menace to warrant their removal, even though these attacks have produced no serious systemic infection and where between the attacks the tonsil may appear to be quite normal. In the second place, a single attack of acute tonsillitis is hardly a sufficient cause for their removal, unless this attack has been complicated by a more or less serious systemic infection such as an endocarditis, a nephritis, or an attack of rheumatism, or unless the tonsils are left palpably the seat of a persisting infection as evidenced by congestion with enlargement or when the cervical lymphatics are swollen.

A frequent error is made in advising the removal of tonsils supposed to be the seat or a chronic infection and where there is no history of attacks of acute infection. As a matter of fact, distinct evidence of chronic tonsillitis which warrants their removal is not uncommon where the patient gives no history of having had attacks of acute tonsillitis. Tonsils that are red and swollen and especially where the cervical lymphatics are swollen are certainly a menace and should be removed. Tonsils that are not enlarged but from which pus can be expressed are also recognized as a menace, but this is a relatively rare occurrence. It is a common inaccuracy for the ordinary cheesy plugs or a more or less liquefied condition of these plugs so commonly found in the tonsils of adults to be referred to as pus. The significance of such cheesy plugs is quite different from that of the actual presence of pus. Where these cheesy plugs are not causing any local annoyance, I ordinarily leave such tonsils alone unless advised to remove them by the internist because the patient is the victim of a serious systemic infection for which no other focus can be discovered. This brings me to the last point I wish to make. The specialist should assume the responsibility of advising removal of the tonsils only in those cases where the indications are the local findings, when there is a history of repeated attacks of acute tonsillitis, or where the local findings indicate tonsils that clearly constitute a menace. In all other cases where the indication for operation is some systemic infection, the best way to avoid the risk of unnecessary operating is to make a statement of our local findings and allow the internist who has charge of the case to decide whether the situation warrants the advice to remove the tonsils; for, while we are all anxious to do everything that can be done for the patient, we are equally anxious to avoid unnecessary operating.

BLOOD-PRESSURE TECHNIQUE CLARIFIED*

CHESTER H. CLARK, M.D.
Late-Major M. C. U. S. Army
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Blood-pressure is one of the most important diagnostic tests for the surgeon to apply to the patient whom he is about to operate. Many a life has been sacrificed on the operating table due to an unsuspected lesion causing a high blood-pressure. Who can not recall patients of the so-called successful operation, from the operation room standpoint, who died within the next few days, because sufficient tests had not previously been performed? Do you wonder that the surgeon shrugs his shoulders when asked the cause of death by the relatives, when the one dearer to them than life itself dies of such neglect, and answers, "It was from some unknown cause and had to be"? Who has not heard the question asked, "Doctor, what was the cause of Mary's or John's death when you assured us that there was no danger connected with the operation?" Had the surgeon made the proper tests, including the phases of the blood-pressure, he might have prepared the patient to have successfully resisted the operative shock as well as stimulated the defective organs during the post-operative period.

The same applies to every obstetrical case coming to the doctor during the prenatal period. These examinations should not only be made the first time you examine the patient, but at each successive call—at the very least, as often as the urine is examined. The blood-pressure may shoot up within a few hours after the delivery and may be the first sign of a threatened eclampsia—let me impress upon you the importance of taking the blood-pressure, calculating the four phases of the pulse-pressure, with the very first untoward symptoms of the mother during the recovery period. During the past month the author was called into consultation, to see a mother whose blood-pressure and urine were normal prior to confinement, who six hours later had a severe headache and blind flashes before the eyes. Prompt action did not prevent the eclamptic spasms, but it undoubtedly saved the life of the woman.

The internist, in making the thorough physical

examination, is in no way excused from making the blood-pressure a routine part of his regular technique. In fact, many up-to-date physicians are taking their sphygmomanometer about with them on their regular calls and are using it as regularly as their thermometer. It has been the custom of the writer, as a surgeon, to use his sphygmomanometer and record all its reading upon his records, for years. It is not sufficient for the doctor to ascertain the systolic pressure, in many respects the least important of the cycle; it is the diastolic pressure that is the reading least affected by the existing agencies causing the high systolic pressure. The pulse-pressure in the cycle is the part requiring the most thorough study and mastery in all its phases. The pulse-pressure is the gauge, to a large extent, of the fitness of the patient to successfully undergo the operation: if you please, it may be called the balance wheel indicating to the internal medicine man the condition of the patient as to whether he will slow or increase the tension with the internal secreting glands' products. The up-to-date physician readily gathers from its data, whether the patient is healthy or diseased.

Those of you who are using the different types of sphygmomanometers regularly will often find those cases where the stethoscope will fail to transmit a satisfactory tone and you will need to palpate the pulse. The author found that a combined use of the stethoscope and one of the fingers greatly assisted in securing the impulse and tone from the first throb of blood passing through the artery as the pressure was sufficiently lowered. Hence, I have named it the combined stethoscopic and digital method. Many of the workers in the T.N.T. plants have relaxed, soft arteries, which make this method especially valuable in securing the four phases of the pulse-pressure. The author strongly urges all to employ this method in their routine general practice as of value in all cases.

In order to make this method clear to all, the routine procedure will be briefly outlined. The Faught, on account of its screw release valve, gives the most satisfactory sustaining of the needle upon steady release, and was the type adopted by the U. S. Army. In my office work I prefer the Mercer sphygmomanometer of the mercury column, thermometer type, on account of its accuracy as compared to the spring type.

In taking the blood-pressure, care should always be taken to have the rubber tube extending from the cuff to the dial back of the olecranon process when

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the arm rests upon the table, as seen in Figure 1, or, better still, passing back of the olecranon around the outside of the arm. Without this care, the arm many times rests upon the tube, and all recording instruments will play back and forth in an erratic manner.

In private practice, the reading should be made not only on one arm but upon both arms when certain questions arise as to differential diagnosis. The patient should be seated, relaxed and perfectly at ease, with the arm resting on the table, being assured that he will experience no discomfort. It is always best to place the cuff on a level with the heart; for, if it is above, it will show a lower reading, and if placed below the heart will show a higher reading. In every case, the author places the stethoscope upon the brachial artery at its bifurcation to form the radial and ulnar arteries. A stethoscope of the Bowles type proves most satisfactory but the upright stethoscope may be employed. The author in all these examinations used the combined stethoscopic and digital method. The index and ring fingers, slightly bent, hold the bowl, while the middle finger extends down straight and rests upon the brachial artery, as in Figure 1. Meanwhile, the right hand pumps the air into the arm cuff (Fig. 1), until the pressure reads 200 mm. hg. Now, with the thumb and first two fingers of the right hand, gradually release the air-pressure. With this method, one gets a double check of the systolic pressure, for with the middle finger one feels the beat of the brachial artery and at the same time the stethoscope conveys to the ears the impulse of the blood overcoming the pressure of the arm cuff. As stated before, this blood will pass through certain arteries in such a feeble manner as to be inaudible, but the finger seldom fails to detect it. This method saves a great deal of annoyance to the physician and at the same time requires the arm of the patient to be compressed but once. Then, when one is examining hundreds of cases in a few hours, accuracy and speed are essential.

During the fall of 1918 and the winter of 1919, the author made hundreds of examinations of trinitrotoluol workers at the Rock Island Arsenal. These examinations at the plant were made weekly on all employes coming in close contact with the explosive T.N.T. and included the taking of the blood-pressure with a Faught pocket apparatus.

The diastolic pressure is not so clearly indicated to the finger on the brachial artery when one does not hear the faint beats of the fourth phase trans-

mitted by the stethoscope, which indicates the end of the pulse-pressure or the diastolic index. Still, with experience, one can detect the same jerky play of the pulse as the eye can detect the jerky play of the hand of the dial. This method is then, too, a valuable double test of the diastolic pressure, though by far more difficult than the ascertaining of the systolic in these inaudible cases.

As far as we have been able to ascertain in the literature and on discussing the matter with leading diagnosticians, this combined method originated with the author. For a good many years, we have occasionally examined patients where the stethoscope failed to transmit the sound and were obliged to resort to the digital examination at the wrist.

In examining the trinitrotoluol workers, we found their blood-pressure reduced, and soft, relaxed and easily compressible vessels. The same is true in those cases which Crile describes as shock, "a temporary depression or collapse of vital forces from physical trauma, in which there is an alteration of blood-pressure due to vasomotor inhibition or exhaustion." In the author's cases, we found in these T.N.T. cases the cardiac weakness so evident, and the cardiac strength so manifest, that we determined to pursue the work with greater accuracy and speed. Therefore, we combined the stethoscopic and digital method, which we found gave precision to the pulse-pressure phases. This will be brought out later on more fully as the author describes the cases examined while under the intoxication of the T.N.T. absorption, as compared to the 500 cases supposedly in normal health and coming from the different walks of life examined by Bertnard Smith in the American Army Aviation Service.

Our combined tabulated reports show that over two thousand examinations were made, but not on that many different cases, as many were examined for over a period of three months. We found on an average normal systolic pressure of 128.6. The T.N.T. worker's blood-pressure rises 10.08 mm. systolic for the first ten days. As the worker becomes affected by the absorption of the poison, his blood-pressure suddenly falls 25.28 mm. below normal by the end of the first 44.79 days, on an average. After this, the worker becomes apparently immune to the poison to a certain extent. The systolic pressure rises slowly until it has increased from its lowest point 21.05 points in 23.05 days, but never reaches its normal so long as the worker is in contact with the explosive.

TABLE 1

Systolic of T.N.T. Worker

Average normal	128.60
Average after 10 days.....	138.68
Average after 44.79 days.....	103.32
Average after 67.74 days.....	124.37

The diastolic pressure of the T.N.T. worker rises 4.05 mm. above normal (86.45 mm.) during the first 6 days and then begins to fall until there is a loss of 16.9 mm. below normal for the next 21.24 days after he begins work; then the diastolic pressure begins to rise and in 58.51 average days it has risen 21.75 mm. above its low mark. This is slightly above its normal. There is a marked diminution of pulse-pressure in a T.N.T. worker from that of a normal worker, while the pulse phases, divided into four different volumes, are markedly different from the normal blood-pressure. After this, the pulse-pressure will be only 20-30 mm., while that of the normal, by Smith's, is 39-44 mm. By pulse-pressure or phase one, two, three, and four is the time between the systolic and diastolic readings.

TABLE 2

Diastolic Readings of the T.N.T. Worker

Average normal	86.45
Average, 6 days	90.50
Average, 21.45 days	69.45
Average, 79.75 days	91.18

The average of these two tables (Tables 1 and 2) gives us the comparison of normal cases and apparently immune cases.

In Table 3, the T.N.T. workers are coming in the second and third lines from hard work and direct contact with the hot pouring kettles, as seen in Figs. 6 and 7. Without the effect of the T.N.T., their blood pressure chart would be higher than Table 5. Table 4 shows the effect of the men lying down as compared to Table 5, where they are standing after running up twenty six-inch steps, but both tables taken from the average of 400 men in normal health and non-toxic surroundings.

Stone,⁶ pointing out the value of the diastolic pressure in estimating the heart load, adopted the formula $PP \div DP$ with a normal value of 50 per cent.

Goodman and Howell,² in auscultatory pressure phases, named the second and third phases as measures of cardiac strength and the first and fourth as the phases of cardiac weakness. They point out that a cardiac strength factor greater than a cardiac weakness factor denotes a competent myocardium, especially if the second phase length equals more than 40 per cent of the entire pulse-pressure length. They determine the normal value of cardiac strength to cardiac weakness, as 55.4 is to 44.4.

Crampton⁷ has based the vasomotor efficiency percentage on the fact that the vasomotor tone is increased on changing from the recumbent to the upright position. Hence, the systolic pressure is increased and the pulse rate is either unchanged or slightly increased (as stated by Smith) in condi-

TABLE 3

Composite Table of Normal, Toxic and Immune Cases

Pulse Rate	S.P.	D.P.	P.P.	
81.5	128.60	86.45	42.15	Normal Average
55.8	65.5	45.6	19.9	Toxic T.N.T. Average
66.3	124.37	91.18	33.19	Immune T.N.T. Average

TABLE 4

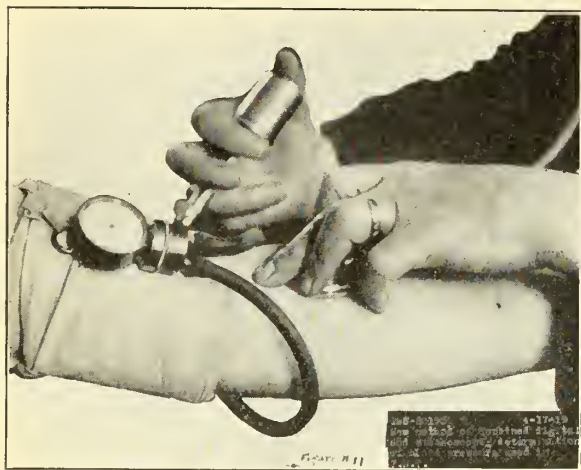
Smith's Readings for 400 Normal Cases

Age	P.R.	S.P.	D.P.	P.P.	—Pressure Phases—			
					1	2	3	4
Range 19-39	78-94	119-132	80-88	39-44	8-18	20-26	5-10	4-6
Average ...24.2	85.4	127.7	84.1	42.2 *	12.1	24.5	6.2	5.1

TABLE 5

Smith's Readings After Exercise

	P.R.	S.P.	D.P.	P.P.	—Pressure Phases Length—				Recovery Time
					1	2	3	4	Mins.
Range	86-138	128-158	84-96	44-68	8-18	24-49	6-16	6-9	3.1-7.6
Average	112	145.4	90.6	54.1	13	33.5	11	7	4.4



New method of combined digital stethoscope; determination of blood pressure used in T. N. T.

tions of lowered vasomotor tone. In T.N.T. absorption, the systolic pressure remains the same or is decreased on the change of position, and instead of increasing the pulse, as is usually the case, the worker shows a decided cyanosis.

The average number of red cells, among those employed more than three months, was 5,200,000 per cu. mm., with an average hemoglobin percentage of 38.7. In cases at work more than one month, the average number of leucocytes was 10,000 per cu. mm., suggesting a stimulation of the hematopoietic system by the poison.

All of the cases examined were seen immediately after conclusion of their shifts and of the 100 cases, seventy-eight were noticed to be cyanosed; of the seventy-eight, eighteen were markedly cyanosed, and 28 per cent had toxic jaundice. The cause of the jaundice has been taken to be the presence of methemoglobin in the blood. Both toluol and anadol powders give off, at room temperature, small quantities of gas, smelling strongly of nitrous oxide. The crude powder is yellow and presumably overnitratd, since if T.N.T. is washed in water the powder becomes white and the water yellow.

In 20 per cent of the cases, the serum was biletinged. This would appear to show that in a high proportion of those cases at work some action of the poison upon the liver was taking place. Captain M. J. Smith, in a résumé of fourteen cases of toxic jaundice, found that thirteen cases showed definite blood changes; but of these only three showed any marked anemia, while Dr. Pantón's twenty-eight examples of toxic jaundice showed only four to have definite blood changes, that of aplastic anemia—a destruction of red marrow.

The average weight loss for the T.N.T. workers was 3.03 pounds for the first average 41.94 days, after which the worker begins to gain in weight and in the average 61.74 days following he has gained an average of 5.26 pounds over his normal weight.

Only an average of .23 T.N.T. workers had a skin trouble after the first 30 days, and of the skin trouble .21 was pigmentation of the skin and .02 was jaundice. Our tests show that more trinitrotoluol was absorbed into the system by the air passages than through the skin. The dust and vapors readily reach the alveoli of the lungs, where it readily dissolves or unites chemically with the tissues and enters into the circulation. In the alveoli, the air gives up its oxygen to the system and is replaced by carbon dioxide. We found that a little trinitrotoluol rubbed into the palm would be absorbed through the thick skin so that in a few hours you could analyze it in the urine. If the skin absorbs it so readily, how much more rapidly the air passages. Guarding the air passages with masks and driving off the fumes and dust before it reached the workers, and by having them change their clothing, and bathe under hot showers before going home, we found very little trouble with the workers after the first few days.

The sphygmomanometers proved the most valuable index of the state of their health and with the above technique the most satisfactory records were kept on file of every worker each week.

Bowes,¹⁰ in a series of studies, says that experience has taught us that if all employes who have passed the age of 45 years were examined at regular intervals, the number of accidents would be greatly reduced. This is especially the case since liability acts went into effect. Nearly all the life insurance companies require both systolic and diastolic readings in their examinations. These reports often alone indicate nothing, unless compared with other objective and subjective symptoms. Often a person will pass a satisfactory physical examination until the blood-pressure is taken. Then, by carefully studying the case, something will develop after weeks. Assisted by the laboratory tests, the etiology will develop and sometimes with startling rapidity and a severe degree of acuteness.

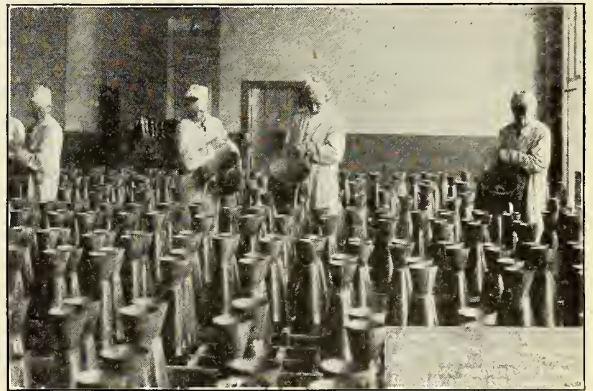
Polak¹² sets forth the advantage of a complete record of kidney functions and blood-pressure in every case before deciding to operate. The pulse-pressure is the test of the muscular strength of the

heart, when endocardial lesions can be excluded. This pressure should be one to three as compared to the systolic pressure.

Hypertension, according to Riesman,¹³ occurs in great frequency with woman patients over 45 years of age, the greater number occurring between 50 and 60 years. They are constipated and suffer from intestinal indigestion. In most instances, the heart is enlarged, chiefly on the left. In these cases, the blood-pressure of pregnant women, as observed by Danforth in a series of 115 cases, showed the average less than that of the non-pregnant. Labor cases, in many instances, show a rise of arterial tension. In toxemia, a rise of blood-pressure is found, except in rare instances. In the different classes of cases of arteriosclerosis, a great diversity of opinion arises as to causes and findings. In no other class of cases does one need to use such great care in matter of technique. To illustrate, the author was called to a lumberman who was an active golf player, who dropped dead on the links. The cause of the death was pronounced arteriosclerosis of the coronary artery. Due to a large life insurance carried by the patient, we performed an autopsy. The pathologist carefully opened the brain, the arteries of the thorax and the abdomen, then of the limbs, and found no deposits indicating arteriosclerosis; and, turning with a smile, wanted to know what about the diagnosis. We insisted on a careful dissection of all the arteries of the heart, and, true to calculations, there was a sclerosed area of the right coronary artery for one inch in length and in the center of this sclerosed area scarcely a hair would pass through the lumen. This man would have passed a perfect life insurance examination without a careful double blood-pressure test. Another case, not long ago, we saw at autopsy in Thief River Falls, where there was no evidence of sclerosed arteries save in the bifurcation of the left coronary artery, where there was a hard, calcareous deposit obstructing the artery for 2 cm. This man, in his late fifties, had walked from the depot facing a cold wind below zero to the hotel and asked for a chair to rest in, and sank down never to rise again. It is true the coronary, cerebral and splanchnic arteries give a more pronounced regularity of symptoms than other arteries sclerosed over only a small area. In these cases, you note the inequality of the pressure taken on the two sides of the body where one has arteriosclerosis. In doubtful cases, simultaneous observations should be recorded.

The author, in taking a 55-minute flight at Cha-

nute Field with Major R. W. Schroeder, who since made the world's altitude record of nearly forty thousand feet, took the blood-pressure reading at 15 degrees below zero, at an altitude of nine thousand feet and found it to be 116 mm. systolic. Both before the flight and upon landing, the systolic was 120 mm. This flight was made to show that as the resistance of the external pressure on the arteries was lessened the blood-pressure would be lessened, and proved true to calculations. Published claims had been made that the pressure was raised and might reach 200 mm. at certain altitudes. This could only be imagined with the aviator in the first stages of fright, when the whole system might be drawn into a hypertension prior to the state of shock, when the aviator, through fear, has a hypotension. Then there is an anemia of the brain and he practically experiences a partial motor paresis, to such an extent that he is unable to work the shifting levers. At great heights, aviators are forced to carry oxygen tanks and when these give out there is an anemia of the brain, as well as a very low blood-pressure, causing the aviator to lose both consciousness and control of the machine until a lower altitude is reached. Experiments have proven that in hemorrhage the blood-pressure



Shop interiors and machinery. View in T. N. T. plant, showing method employed in loading high explosive shells.

must be higher than normal in order to procure an adequate oxygen supply to the tissues. In this regard, it will be seen that the greater the altitude the less will be the pulse-pressure, the less the percentage of oxygen in the air, while the system is requiring a greater demand for oxygen.

CONCLUSIONS

1. Pulse-pressure is more useful and definite as ascertained with the combined digital and stethoscopic method. And there seems to be limitless

values to be worked out of the cardiac muscles and stimuli during the different phases.

2. It evidently appears, as Dana¹⁵ states, that the systolic pressure, while a measure of peripheral resistance and as such the result of a compensatory mechanism, is not, in these cases, the result of permanent changes in the renal capillaries, but is the effect of vasoconstriction; whether this be due to the toxins or the chemical agents circulating in the blood, acting as vasoconstricting substances, or from the vasoconstricting secretions of particular glands of internal secretion, or the result of exterior elements, such as oxygen or relaxation of atmospheric pressure, is not clear.

3. Diastolic pressure is believed to be the safety valve of the cycle, and is least affected by the secretions of the internal glands, toxins, or chemical poisons circulating in the blood stream.

4. Cases may react under different conditions to a change of the blood-pressure without diseased condition of the cardiovascular renal system. Many diseased conditions of the ductless glands may exist for indefinite periods before producing changes in metabolism of the ductless glands, causing hypertension.

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ESSENTIAL FINDINGS IN PULMONARY TUBERCULOSIS IN CHILDREN*

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If we confine the discussion of the subject strictly to the limitations set down in the title announced, we find ourselves restricted to the determination of the presence or absence of the tubercle bacillus in the sputum—the presence of the tubercle bacillus being the only finding in diagnosis which is conclusive in itself.

However, there are many other important evidences, no one final in itself, several of which, taken together, may form the basis of a reasonable opinion. None of these alone can be considered essential, but it is essential to determine whether or not they are present.

They include: (1) exposure to infection, (2) occurrence of predisposing causes, (3) physical signs in the chest, (4) characteristic x-ray findings, (5) positive tuberculin reaction, (6) symptoms relating to the chest, (7) constitutional signs and symptoms.

It is assumed that it is unnecessary to repeat at this time the standards for the diagnosis of thoracic tuberculosis in childhood prepared for the National Tuberculosis Association by Committees of the Framingham Health and Tuberculosis Demonstration, inasmuch as these are readily accessible and well known to you all.

A brief examination of the summaries of findings, resulting from the personal observation of 280 children admitted to Nopeming Sanatorium, May 22, 1912, to September, 1921, has seemed to us preferable to a general discussion of the subject.

These cases have been classified as follows:

TABLE I

Classification of 280 cases admitted to Children's Department, Nopeming Sanatorium:

Pulmonary tuberculosis	86
Glandular tuberculosis	87
Bone tuberculosis	32
Eye tuberculosis	5
Meningeal tuberculosis	4
Peritoneal tuberculosis	3
Pleurisy with effusion.....	2
Suspected tuberculosis	61

In 35 of the cases of suspected tuberculosis, there was a definite history of exposure to tuberculosis in the family. These children were kept under observation in the children's cottage and were not in contact with open cases. Such treatment accords with the recommendation of the Framingham committees that in all cases where there is doubt it is better to make a provisional diagnosis of tuberculosis and give the child the benefit of hygienic measures and prolonged observation, although this does not necessarily mean that the child be sent to a sanatorium.

There were 86 pulmonary cases, 30.7 per cent of the total observed, or, excluding suspects, 39.2 per cent. Park and Krumwiede found 50 pulmonary cases in a series of 543 cases of tuberculosis in children under 16 years of age. Our series includes all under 15 years. It is probable that a larger percentage of pulmonary cases seek admission to a sanatorium than would be found in city practice.

The following observations have reference to the 86 cases in which a diagnosis of pulmonary tuberculosis was made. The average age of these patients with pulmonary disease was twelve years, as contrasted with the average age of all children admitted, nine years.

Evidences of tuberculosis were present as follows:

TABLE II

Findings in 86 cases of pulmonary tuberculosis admitted to Children's Department, Nopeming Sanatorium:

	Cases	Per-centage
Exposure to infection.....	38	42
Physical Signs—		
Incipient lesion	52	60
Moderately advanced	20	24
Far advanced	14	16
Presence of tubercle bacilli.....	21	24.2
Positive von Pirquet.....	25	29
Elevation of temperature.....	81	95
Rapid pulse	81	95
Cough	71	87
Loss of weight.....	79	91
Hemoptysis	5	7

The family history of these patients showed intimate and unmistakable contact in 38 instances (42 per cent), contact with a tuberculous mother

accounting for 60 per cent of the 38. Post-natal infection is influenced not only by intimacy, but by time and age of contact, it being conceded that exposure at the time of birth to a tuberculous parent is more dangerous than exposure to a parent whose manifest disease occurs several years later.

The physical signs presented were those of incipient disease in 52 cases, or 60 per cent; moderately advanced in 20 cases, or 24 per cent; far advanced, 14 cases, or 16 per cent.

The unusual percentage of incipient cases recorded, being much higher than the percentage of incipient cases found in all patients admitted, is perhaps due to the more careful observation to which children are subject in their homes and the growing custom of making early use of the tuberculosis clinic. At the same time, it must be recognized that in some of these cases the altered breath sounds, altered voice and, in some instances, the râles detected and interpreted as signs of an incipient tuberculous lesion in the lungs, may have been due to other causes, and the lesion actually have been extra-pulmonary.

Tubercle bacilli were found in 21 cases, or 24.2 per cent. This low percentage is partly explained by the well-known difficulty experienced in the obtaining of sputum from children for examination. At Nopeming, we are now using pharyngeal swabbing (in some cases, laryngeal as well) as a routine measure in all negative cases. We inject samples of the feces into guinea pigs, using the Alexander method. The results of these tests are not yet available for publication.

The von Pirquet reaction was positive in 25 cases, or 29 per cent; negative in 6 cases, or 7½ per cent; omitted or incompletely recorded in the remainder. Notwithstanding the asserted unreliability of the test in older children, we believe that the test should be studied in all children presenting themselves for examination.

The significance of fever and rapid pulse, even when these are taken in accordance with the standards of The National Association, is not so plain, in children, as to deserve special comment by itself. We found fever and rapid pulse both present in 81 cases—95 per cent of our series.

Cough was present in 71 individuals, 87 per cent of those examined. This symptom, while not pathognomonic of pulmonary tuberculosis, is always of importance, and requires explanation.

The loss of weight, noted in 79 cases, or 91 per cent, was merely of corroborative value in confirming the diagnosis.

Hemoptysis, admittedly infrequent, in children is recorded in 5 cases, or 7 per cent of the cases investigated. Slight hemorrhages occurred in one incipient, two moderately advanced and three far advanced cases.

This summary of our observations leaves us with the feeling that aside from the demonstrated presence of tubercle bacillus, all other signs of pulmonary tuberculosis in children are merely suggestive.

Our failure in finding convincing evidence of pulmonary tuberculosis in cases where we felt sure it was present, has led us to a conviction of the necessity of using every available method for finding the tubercle bacillus. We especially desire to direct your attention to the advisability of having the feces of all suspected cases, in which there is no sputum or negative sputum, tested for the presence of tubercle bacilli by injection into guinea pigs. It is a well-known fact that the feces of most open cases of pulmonary tuberculosis contain tubercle bacilli derived from swallowed sputum.

None of the other signs of pulmonary tuberculosis taken by itself is conclusive. Several of them occurring in the same case render the diagnosis of tuberculosis as probably correct. Such evidence must be weighed in the balance of common sense and time must be allowed for leisurely judgment, a term we have used advisedly as peculiarly applicable to diagnosis in children. The time element in diagnosis does not affect their affairs as it does those of adults; they have no social responsibilities pressing upon them or compelling delay in treatment; no stigma—such as it may be—attaches to them from sanatorium residence; they can well afford the time required for careful observation of the symptoms and signs which aroused suspicion, even though the regime under which this is accomplished may in some cases prevent the onset of manifest disease.

The question of *x-ray* findings we have not discussed, as this phase of the subject is being considered by others, and the number of observations we have as yet been able to make is small.

Acknowledgment should be made of the valuable assistance rendered the writers in the summarizing of the records by Mrs. Bernice B. Conroy.

A STUDY OF THE SEVERE SECONDARY ANEMIAS*

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Secondary anemia is a very interesting condition, largely because of its association with so many different diseases. Its presence in varying degrees of intensity in one and the same disease, often independent of the duration of the latter, adds much to its mystery. The distinction between pernicious anemia and secondary anemia, as generally known, is that in the former the cause is unknown, while in the latter the cause is known. However, in a consideration of anemia one is led to believe that there is still much regarding the etiology of secondary anemia which has not been solved. The absence of anemia in one patient suffering from a certain disease contrasted with the presence of a severe anemia in another person with a similar disease is, as will be brought out in this paper, not an uncommon finding. This leads one to believe that other factors often play a part in the causation of the anemia. The determination of these other factors must of necessity often be speculative. For example, the co-existence of both bleeding and infection in a patient with severe secondary anemia often leads to confusion and doubt as to which factor is the more responsible for the anemia. In other patients with only one obvious cause for the anemia, one cannot help but believe that at times other factors are contributing towards its development.

The question of treatment of secondary anemia, as well as the study of pernicious anemia, will not be taken up in this paper.

It is my intention in this paper to consider only the more common causes of the severe secondary anemias. I shall arbitrarily take a hemoglobin of 30 per cent, considering everything below this as representing a severe secondary anemia. The conditions which may cause a mild secondary anemia are too numerous to mention, and obviously can not be discussed here except to bring out certain points of comparison as to prevalence, and so forth. Out of approximately 1,500 secondary anemias seen at the Mayo Clinic from January, 1918, to August, 1919, 144 presented a hemoglobin of 30 per cent or less. Because of the similarity of the

*Written while a Fellow on the Mayo Foundation.

blood picture in these cases and also to enable the reader to visualize and draw comparisons more readily, I shall, for the most part, present the salient features of the blood picture of the whole series in one discussion, and in the consideration of the different groups or individual causes of the severe secondary anemias I shall refer to certain features of a blood picture as the occasion arises. Because of the large number of conditions considered, an attempt will be made to discuss only those which have a special interest or about which there is a diversity of opinion. The classification given below is not a classification of secondary anemias in general, but is used largely for convenience of description and reference.

GROUP I. ASSOCIATED WITH TUMOR FORMATION

A. *Malignant* Cases

1. Cancer of the stomach..... 26
 - a. Ulcerating cancer of the stomach with spontaneous hemorrhage 2
2. Malignancy occurring elsewhere..... 15
 - a. Colon 5
 - b. Cancer of the cervix following degenerating cervical polyps 1
 - c. Sarcoma of the uterus with lues..... 1
 - d. Papillary epithelioma of the bladder..... 1
 - e. Abdominal and pelvic malignancy..... 1
 - f. Old cancer of the breast with metastases..... 1
 - g. Hypernephroma of the left adrenal..... 1
 - h. Cancer of the cardia..... 1
 - i. Probable malignancy of the pancreas..... 1
 - j. Tuberculous glands of the neck with melano-epithelioma of the neck..... 1
 - k. Carcinomas with positive Wassermann..... 1

B. *Benign*

1. Uterine fibroids or myoma..... 35
 - a. Cervical polyps 2
2. Miscellaneous 3
 - a. Adamantomas of the lower jaw..... 1
 - b. Ovarian cyst 1
 - c. Adenoma of the thyroid..... 1

GROUP II. ASSOCIATED WITH HEMORRHAGE

1. Hemorrhoids 15
2. Duodenal and gastric ulcers..... 7
 - a. Those simulating ulcer..... 1
3. Uterine bleeding without tumor formation..... 4
 - a. Menorrhagia 2
 - b. Childbirth 1
 - c. Abortion 1
4. Miscellaneous 2
 - a. Nasal perforation 1
 - b. Nosebleeds 1

GROUP III

1. General diseases 18
 - a. Chronic ulcerative colitis..... 4
 - b. Nephritis 6
 - c. Lues 4
 - d. Decompensated heart 1
 - e. Nutritional 1

- f. Arthritis deformans 1
- g. Exophthalmic goiter? 1
2. Leukemia
 - a. Myelogenous leukemia 1
 - b. Acute lymphatic leukemia..... 1
3. Parasitic
 - a. Malaria 1
 - b. Bothriocephalus with pernicious anemia..... 3
4. Unknown causes 4

GROUP IV. INFECTION

1. Chronic sepsis 6
2. Pelvic infection
 - a. Ovarian abscess 1
 - b. Pelvic infection with ovarian abscess..... 1
 - c. Purulent endometritis 1

The hemoglobin in 43 of the patients under consideration was 20 per cent or less. None of these presented a hemoglobin of 15 per cent; the lowest hemoglobin, 10 per cent, was observed in 8 patients. Only one patient with cancer of the stomach had a hemoglobin as low as 10 per cent, whereas 5 patients with uterine fibroids or myomas showed a hemoglobin of 10 per cent.

The red blood count was below 2,000,000 in 33 patients. The lowest red count was 900,000, which was present in a patient suffering from chronic nephritis. This was the only count below 1,000,000, the next lowest being 1,060,000, in a patient with gastric and osseous lues. Only one patient with cancer of the stomach presented a red count below 2,000,000, whereas 7 patients with uterine fibroids or myomas had a red count below 2,000,000.

The color index in general varied between 0.3 and 0.6. Two patients presented a color index below 0.3. These were 0.2 and 0.2+ and were observed in patients, one with a history of abortion and the other with uterine fibroids. The highest color index in cancer of the stomach was 0.7 per cent. Ten patients presented a color index of 0.8 or above. Of these, 4 had a color index of 0.9; namely, patients with hypernephroma; cancer of the breast with metastases; lues associated with purpura, tetany, and so forth; and nephritis (?). A patient with gastric and osseous lues had a color index of 1.3, which was the only color index noted above 1. It was felt, however, that this patient had a pernicious anemia.

Seventy-nine of the total 144 patients had a complete blood count made. The differential count in general was not significant. Either slight or moderate anisoleukocytosis and slight or moderate poikilocytosis, usually with slight polychromatophilia, were the common findings. Marked aniso-

leukocytosis was observed in 4 patients, as was marked poikilocytosis in a similar number. The patients presenting the latter findings were in the anemias due to abortion, nephritis, and in two patients in which the anemia was due to unknown causes.

Normoblasts were observed in the blood picture of 22 patients. Only one patient with cancer of the stomach showed the presence of normoblasts. This represents 14 patients on whom complete blood counts were made. Two patients with anemia of unknown origin showed the presence of 28 and 18 normoblasts, respectively, 28 being the greatest number of normoblasts observed. Other fairly high normoblast counts were observed in the patients with a history of abortion and in a patient with nephritis.

Megaloblasts were observed only in 2 patients, namely, the patient with history of abortion and in two patients with anemia due to unknown causes. Slight granular degenerated reds were observed in 4 patients, namely, in a case of hemorrhoids, abortion, nephritis, and in a case of anemia due to unknown origin.

In a consideration of the malignant tumors, one feels that there is as much mystery associated with their tendency to produce anemia as there is in the etiology of the malignancy itself. Why one person should exhibit a profound anemia, and another person with a malignancy similarly located and similarly advanced should exhibit a normal blood picture, is a problem which baffles solution and, at least up to the present, has belonged in the realm of speculation.

Laache, quoted by Ewing, concluded that there is an individual susceptibility to the effects of malignant tumors. Leichtenstein, Patrigeon, quoted by Ewing, and Ewing himself, have observed cases of gastric cancer with increase of hemoglobin to 100 per cent shortly before death. Ewing feels that in some gastric cancers there may be a concentration of the blood, probably from diminished fluid ingesta, which maintains the quality. Ewing further states, "The sources of the anemia of malignant tumors are numerous and complex." Among these he mentions: Hemorrhage, interference with the ingestion of food, the absorption of hemolytic agents from ulcerating and infected surfaces, and from necrosing areas of closed tumors, and so forth. Maragliano, Kullman, Polk and Bard, and many others, quoted by Ewing, have demonstrated

the presence of hemolytic properties in the blood of cancer. Elsberg, Weil and Bard, quoted by Ewing, have demonstrated the hemolytic properties of cancerous cells.

As the table shows, by far the greater number of patients with marked secondary anemia resulting from malignancy had their seat of malignancy in the stomach. Naegeli, in speaking of gastric cancer, states that its location plays a very striking influence on the blood picture, and that with metastases in the bone and in those latent cases which do not give any clinical symptoms except the anemia itself, there is a much greater anemia.

Of the 26 patients with cancer of the stomach, 14 were operated on. In a series of approximately 300 patients operated on at the Mayo Clinic for cancer of the stomach, only 46.5 per cent presented a hemoglobin of 30 or less. Approximately 50 per cent of the patients in this series had a hemoglobin above 70 per cent.

It is astonishing how often a patient with cancer of the stomach will present a normal blood picture, even though the cancer is quite advanced. Cabot, quoted by Naegeli, in 72 patients with cancer of the stomach, found the red blood cells about 5,000,000 per c.mm. in 19 patients, and in none of his patients was the blood below 1,000,000 per c.mm. Naegeli also quotes Baradulin finding no patient with a red blood count below 1,000,000 in a series of 81 patients with cancer of the stomach. According to Naegeli, the red blood count goes below 1,000,000 only very occasionally. In our series, no patient presented a red blood count below 1,000,000. This was also true in Osler's series of 59 cases of cancer of the stomach. Clerc and Gy, Engel, Grawitz, Hanot and Gilbert, Hayem and other men, quoted by Naegeli, reported patients with red count below 1,000,000, associated with cancer of the stomach, the lowest count being 400,000, reported by Engel.

Not one of the patients in our series of cancer of the stomach presented a blood picture that could have been confused with the blood picture of a patient with pernicious anemia. It was always that of a typical secondary anemia. The color index, as already noted, averaged between 0.3 and 0.6, and in no patient was it 0.1 or over 1. Oswald Miller, quoted by Naegeli, in 20 patients with cancer of the stomach, found none with a high color index. Naegeli also quotes Conti and Rossi as finding only one color index above 1 in 40 patients, and Baradulin as finding a color index of 1 in 3

patients and above 1 in one patient in a series of 81 patients. Naegeli is inclined to believe that the blood picture is that of a definite secondary anemia and he quotes Hirschfeld as finding only typical secondary anemia.

Harrington and Teacher, quoted by Osler, feel that in metastases of bone marrow the blood picture may be that of pernicious anemia. A complete blood count was made on 14 of the 26 patients with cancer of the stomach. As already noted, normoblasts were present in the blood picture of only one of these 14 patients, while megaloblasts were not observed. Conti and Ross, quoted by Naegeli, found normoblasts in only 7 of 40 cases. They observed megaloblasts in only one case. Naegeli feels that normoblasts and megaloblasts are not present in the usual case.

In regard to malignancies in general, a marked anemia should always put us on our guard and every effort should be made to determine the reason for its presence. It is surprising how often an indeterminate secondary anemia, especially when marked and progressive, will turn out to be the result of malignancy. In fact, every now and then the chief symptom and at times the only symptom which malignancy manifests is a progressive anemia. According to W. J. Mayo, "Cancer of the body of the stomach and cancer of the cecum and ascending colon may produce striking anemias early, before there are local symptoms."

Naegeli, in speaking of cancer of the stomach, says that anemia is often the first symptom, and cites two cases where the hemoglobin was 12 and 10 per cent respectively without any other clinical symptoms.

On the other hand, the presence of a normal blood picture should not prejudice one against the possibility of an existing malignancy. This was brought out not only in the stomach series, but also especially forcibly in the cancers of the colon and rectum. Thus the 5 cases of cancer of the colon listed as causes of marked secondary anemia represent the total number with a hemoglobin less than 30 per cent out of approximately 250 patients operated on where the hemoglobin was listed. Of the total number of patients operated on for cancer of the colon at the Mayo Clinic from January, 1918, to August, 1919, about 40 per cent had a hemoglobin of 70 per cent or under, whereas about 60 per cent had a hemoglobin above 70 per cent.

In general, patients having benign tumors either

present no evidence of anemia or only a mild degree. However, a very notable exception to this is observed in patients with uterine tumors. These offer a very fruitful source of the anemias and as already observed comprised 35 of the total 144 patients with severe secondary anemia. As a general rule the anemia developing from uterine tumors is a gradual one, the average patient in the group giving a history of profuse flow dating back two or three years. The longest history of profuse flow was nine years, while the shortest was two months. In the latter, however, the patient had flowed constantly. Three patients in the group presented a history of no other symptom than that of acute hemorrhages.

A complete blood count was made on about one-half the patients. As already noted, the blood picture was that of a typical secondary anemia, the color index averaging from 0.3 to 0.5. The lowest hemoglobin observed was 10 per cent. None of the patients presented a red blood count below 1,000,000. Normoblasts were observed in 3 patients with uterine fibroids. Megaloblasts were not noted. Marked anisoleukocytosis and marked poikilocytosis were observed in the blood picture of one patient. The other blood findings were not significant.

When one considers a large group of patients with nonmalignant uterine tumors, one is impressed by the relative infrequency of severe anemias resulting. Thus, in an analysis of several hundred patients who received intrauterine therapy, only from 2 to 3 per cent presented a hemoglobin of 30 per cent or under. Approximately 40 per cent of these patients presented a hemoglobin of above 70 per cent.

It is quite interesting to note that 2 patients presented severe secondary anemia because of cervical polyps. Both of these patients at operation showed the presence of cervical polyps, which diagnosis was confirmed by the pathologist. One should always be suspicious of probably malignant degeneration under the circumstances, and care should be exercised to rule this out. As listed in Group I, one patient developed a marked anemia as a result of cancer of the cervix following degenerating cervical polyps.

The second group represents patients with severe anemia resulting from definite bleeding. Fifteen patients presented a severe anemia as a result of

bleeding hemorrhoids. The blood picture was that of a typical secondary anemia. In most cases, it was perfectly obvious that the hemorrhoids in themselves were the sole cause of the anemia. However, in a few patients the anemia was so marked, and a history of bleeding from the rectum in sufficient quantity or over a long enough period of time elicited with such difficulty, that a diagnosis was arrived at largely through careful elimination.

The recognized prevalence of patients with hemorrhoids and the variability of the latter as to bleeding independent of size, necessitates our relying on what the patient has himself noticed; very often the patient is absolutely unaware of even persistent bleeding and develops a severe anemia before the cause of the latter is ascertained. In general, it may be said that in patients presenting anemia of obscure causation, one should always think of hemorrhoids as a possible source. However, this diagnosis should only be arrived at after a careful exclusion of other possible causes, such as malignancy of the rectum, and so forth.

The blood picture of the patients with either gastric or duodenal ulcer did not present anything unusual. The lowest hemoglobin was 15 per cent in a patient with perforating gastric ulcer. That severe anemia is a rather uncommon finding in patients with duodenal ulcer especially, is quite evident from the relatively few cases of severe anemia listed above as being due to ulcer. In an analysis of between 900 and 1,000 patients operated on at the Mayo Clinic for duodenal ulcer, approximately one-half of one per cent had a hemoglobin of 30 per cent or below, and approximately 85 per cent had a hemoglobin above 70 per cent.

At operation, 3 of the 5 patients with severe anemia due to a duodenal ulcer showed the presence of a bleeding ulcer; 2 of the patients gave a history of hematemesis; 84 gave a history of blood in the stools.

Indeterminate gastric hemorrhage was observed in one patient. This patient gave a history of recurring gastric hemorrhages with symptoms suggestive of a duodenal ulcer of nine years' standing. The hemoglobin was 24 per cent. Two fluoroscopic examinations of the stomach and duodenum did not reveal anything abnormal. Because of the suggestive history, and also in order to determine the cause for the hemorrhages, the patient was explored by Dr. C. H. Mayo. The stomach, spleen, liver, and gall-bladder were found to be normal. No

pathology was present except a chronic appendicitis.

That a severe anemia may develop in patients with simple menorrhagia with no definite pathology is quite easily understood. Bleeding from other causes, such as childbirth, abortion, nasal perforation, and obscure nosebleeds, may be the cause of a severe anemia developing in a patient. Many other causes might be cited, such as purpura, hemophilia, obscure internal bleeding, and so forth.

Group III represents patients with severe anemia resulting from general diseases. Four patients in this group presented their severe anemia as a result of chronic ulcerative colitis. The lowest hemoglobin in this series of 4 patients was 17 per cent, while the lowest red blood count was 1,920,000. All of these patients gave a history of blood in the stool. In an analysis of 117 patients with chronic ulcerative colitis, Logan found only 4 with a hemoglobin below 30 per cent, 6 with a hemoglobin between 31 and 70 per cent, and 12 with a hemoglobin between 41 and 50 per cent. He also observed that in 15 of the 117 patients the hemoglobin was above 80 per cent.

Nephritis has been generally conceded to be a common cause of anemia. However, when the anemia is severe it is very probable that in most cases other factors are also playing a part in its causation. Thus in one of the patients in this service the trouble dated from an attack of influenza and this, together with marked dental sepsis, were no doubt at least contributory factors. Another patient presented all the signs of a marked nephritis and died while under observation. Necropsy in this case revealed an acute ulcerative endocarditis and marked enlargement of the spleen, besides interstitial and parenchymatous nephritis. Two other patients in the series with definite clinical evidence of nephritis at necropsy showed, apparently as the sole cause of the anemia, interstitial and marked parenchymatous nephritis, respectively.

The lowest hemoglobin was 18 per cent; the lowest red blood count 930,000. The highest color index observed was 0.9 +. In this patient normoblasts numbered 18 and there was marked anisoleukocytosis and poikilocytosis, slight granular degenerated reds, and polychromatophilia.

The rôle played by lues in the causation of the very marked secondary anemias, for example, with hemoglobin below 30 per cent, is an exceedingly minor and infrequent one. Moderate and at times

fairly marked secondary anemias occur in about 15 per cent of patients with secondary lues, according to Stokes. Of the 4 patients whose anemia I have classified under lues, only 2 could unhesitatingly be put in this series. All 4 had positive Wassermanns. One of the patients had hereditary lues with a history of chronic diarrhea, tetany, and purpura. The other patient had gastric and osseous lues, with an hour-glass stomach and marked narrowing. The color index was suggestive of pernicious anemia, being 1.3 on one occasion and 1—on another. The eye grounds were also suggestive of pernicious anemia. The lowest hemoglobin in the series was 16, with a red count of 1,980,000.

Martin, in a study of 25 patients with severe secondary anemia, found 11 due to lues and showing a 4+ Wassermann. These improved under arsenic. He concluded that profound anemias are often associated with lues. The administration of arsenic improves an anemia whether due to lues or not, so that one can not formulate very definite conclusions when improvement follows antiluetic treatment. The fact that patients with other conditions such as a malignant endocarditis, and so forth, will at times give a positive Wassermann, is likely to lead to confusion and tends to ascribe to lues a more prominent etiologic factor than it really plays. Very often the occurrence of a positive Wassermann is merely incidental and has no bearing on the anemia. In the patients with cancer of the stomach already described, two showed the presence of a positive Wassermann. One must, therefore, be very hesitant about coming to the conclusion that lues is the cause of a severe anemia in a patient even though a positive Wassermann is present. Response to antiluetic treatment should also not be considered as conclusive evidence that the anemia in a given patient is due to lues.

Anemia due to nutritional disturbance is fairly common, especially in infants and children. At times the anemia can become quite marked, and under these circumstances one feels that there must be some other basis for the anemia. However, the speedy response to correction of diet, and so forth, makes it quite evident that one is dealing solely with a disturbance of nutrition. One case was of this nature and the patient on discharge had a normal blood picture.

The patients with arthritis deformans and decompensated heart, respectively, did not present an unusual blood picture from the standpoint of severe

secondary anemia. The hemoglobin was 30 per cent in the former and 25 in the latter.

One patient with exophthalmic goiter showed a hemoglobin of 30 per cent. A careful search for a cause of this anemia did not reveal anything and it was thought that probably the hyperthyroidism was the etiologic factor. However, it has been our experience that exophthalmic goiter, contrary to the usual belief, is a very uncommon cause of anemia. W. A. Plummer showed that in a series of 578 cases seen at the Mayo Clinic in 1912 and 1913, the hemoglobin was below 70 per cent in only 13 (22 per cent). The lowest hemoglobin in his series was 44 per cent. His results corresponded with those of Koohar.

It has been our experience that although tuberculosis is commonly the cause of a mild secondary anemia, it very seldom causes a marked degree of anemia. This is especially true of pulmonary tuberculosis. In a series of 532 patients operated on at the Mayo Clinic from Jan. 1, 1894, to Jan. 1, 1918, for renal tuberculosis, Braasch found that only 73 had a hemoglobin less than 80 per cent. Eight of these presented a hemoglobin of less than 50. Braasch feels that the reduction in hemoglobin is seldom caused by the loss of blood from hematuria, nor is it in proportion to the duration of symptoms of the bladder; but that the greatest reduction of hemoglobin is noted with extensive renal suppuration when absorption of toxins was evidently the cause.

Stokes found that in 30 cases of tuberculids 25 per cent had a hemoglobin below 53 per cent. The lowest was 30 per cent, but in this patient there was a possibility of its being pernicious anemia.

The patient with myelogenous leukemia presented a hemoglobin of 28 per cent and a red blood count of 2.30. One year previous the hemoglobin had been 58 per cent. A patient with acute lymphatic leukemia gave a two months' history of bleeding from gums and showed the presence of petechial hemorrhages and ecchymoses. At his first examination the color index was 1.1+. Three weeks later it was 0.6+ with a hemoglobin of 20 per cent and a red blood count of 1.63 million. Small lymphocytes represented 96.5 per cent of the 36,200 leukocytes. Two normoblasts were noted as well as slight anisoleukocytosis and poikilocytosis.

Some degree of anemia is practically a constant finding in the leukemias, its extent depending in

the chronic myelogenous and chronic lymphatic cases largely on the duration of the disease. Nae-geli states that in the early stages or in light cases of chronic myelogenous leukemia the blood corpuscles are not changed, and that the hemoglobin is also normal. However, with the advance of the disease and cachexia, he states that the anemia becomes severe with the presence of normoblasts, and occasional megalocytes, almost always. He feels that the severe anemias resulting from the acute lymphatic leukemia have a blood picture greatly resembling pernicious anemia. Also, in these cases under septic influence, the severe anemias with normoblasts and megaloblasts he states remind one very closely of pernicious anemia.

Gulland and Goodall, in speaking of lymphatic leukemia, state that anemia is always present and that in the acute cases and particularly in the hemorrhagic forms the anemia may be extreme. He observed one case in which the reds fell from 4,000,000 to 666,000 in ten days. Giffin states that with a definite leukopenia there seems to be much more likelihood of the occurrence of a crisis, with severe anemia and hemorrhage. The anemia may then simulate the primary type, with normoblasts and megaloblasts present. He, therefore, warns us against the injudicious use of radium, as he states that repeated applications of radium once a week for several weeks may initiate a severe anemia with leukopenia.

Parasitic conditions did not offer a very fruitful source of severe secondary anemias in our series. However, our experience concerning anemias of parasitic origin can not be taken as representing a true index of their prevalence owing to the relative infrequency of parasites in this territory. In going over 20 cases in which a diagnosis of malaria had been made, only 8 patients showed the presence of malarial parasites at the time of examination. Only one patient presented a hemoglobin less than 30 per cent; of the remaining 7, none were below 55 per cent. That poor living conditions, and especially poor food, is a big factor in the etiology of anemias occurring in patients with malaria, especially, can not be denied. Bates is convinced that food is the predominant factor in the etiology of all tropical anemias. Mayor Ashford in his work on anemia in Porto Rico also recognized the importance of food.

In four of the patients with severe secondary anemia, no definite cause for its presence could be

determined. In 2 of these patients the anemia was quite marked, having 28 and 19 normoblasts, respectively. The blood of these two patients also showed the presence of megaloblasts, and slight granular degeneration of red cells was observed in one of the patients. Marked anisoleukocytosis and marked poikilocytosis were present in both. The highest color index in the 4 patients was 0.7. One of the 2 patients with the very severe anemia was a child eleven months and three weeks of age. Physical examination showed a moderate enlargement of the liver and spleen. The Wassermann test was negative, as was the von Pirquet on two occasions. The child had a slight cough and failed to gain in weight. The possibility of splenic anemia of infancy was considered. A diagnosis of "anemia of unknown cause" should be made only after an exhaustive study has been made. The patient should, if possible, be kept under observation for at least a few weeks and response to treatment determined. Obscure malignancies, pernicious anemia, and so forth, should be repeatedly considered and ruled out only after a plausible explanation for the anemia is arrived at.

ANEMIA DUE TO SEPSIS

A diagnosis of marked secondary anemia due to probable sepsis was made in 7 patients. In none of the patients could a history of bleeding be elicited. An exhaustive study of these patients failed to reveal any other likely cause for the anemia. The presence of *entameba histolytica* was observed in an examination of the stools of one of the patients. However, it has been our experience here to find a severe anemia an extremely rare finding as a result of *entameba histolytica*. The patient's anemia did not improve on instituting treatment for the parasitic condition. On ordinary measures the patient showed marked improvement at the end of six months. One patient presented a malignant endocarditis. Blood culture showed long chained streptococci. The lowest hemoglobin was 25 per cent and the lowest red count 2,130,000. The highest color index was 0.6. In 4 of the patients in which a complete blood count was made the differential count was not unusual and the other findings were those of a moderate secondary anemia. No normoblasts or megaloblasts were observed.

Gulland and Goodall state that in conditions of generalized sepsis or absorption of septic products in such affections as malignant endocarditis or purpurial fever the blood changes are profound.

Reds may fall to 1,000,000. He further states that normoblasts are rare in chronic, but frequent in acute cases. Megaloblasts are absent. The color index rarely is above 0.8, even in the worst cases.

Hunter regards anemias more from the standpoint of their etiology, and their infective or non-infective nature. He feels that in nine out of ten cases of "severe anemia" an infective factor is present; that this is in the nature of a septic infection, usually streptococcal; that the sepsis is formed in the mouth in relation to the teeth, and that the clearing up of the focus either stops or greatly lessens the anemia when the latter is due to other causes.

That foci of infection play an important rôle in the production of anemia no one can dispute. Foci of infection should be eradicated in all patients as a routine. However, the presence of even marked dental sepsis or very septic tonsils in a patient with a severe anemia, should not prejudice us against the possibility of other, probably much more important, factors, the discovery of which are of extreme importance in the ultimate curing or checking of the anemia.

Both the patient with the pelvic infection and the patient with the purulent endometritis gave a history of profuse flow, so that the anemia was probably chiefly the result of this and the infection no doubt played a minor rôle in the causation of the anemia.

One thus sees that many conditions may produce a severe secondary anemia. The conditions listed in this paper represent the more common causes. However, other conditions such as myxedema, hemolytic icterus, Hodgkin's disease, and so forth, are quite often associated with a severe anemia. In an analysis of 17 cases of hemolytic icterus, Giffin found one patient with a hemoglobin of 27 per cent and 4 with a hemoglobin between 30 and 40 per cent. Krumbar, quoted by Balfour, collected 10 cases of hemolytic icterus in which the red blood count was below 1,000,000.

No attempt has been made in this paper to discuss pernicious anemia. The patients studied, for the most part, presented a definite secondary anemia blood picture. The importance of this attaches itself especially to those patients with gastric malignancy in which the blood picture was uniformly that of a secondary anemia. The minor rôle played by lues should not be lost sight of, as well as the very minor rôle played by exophthalmic goiter.

Malignancy should always be suspected and ruled out in all obscure severe secondary anemias, but at the same time a normal blood picture should not prejudice one against the possibility of an existing malignancy.

A patient presenting a severe anemia should be studied from every angle, and every possible diagnostic aid, both clinical and laboratory, should be brought into play. These, together with well-seasoned judgment and observation, should be exercised before a final conclusion is arrived at. Repeated special examinations, such as stomach rays, and so forth, should be used in patients with obscure anemia.

Too much importance should not be ascribed to infection from the standpoint of its being the sole cause. Other causes should first be sought and eliminated, and foci of infection cleared up on general principles.

A diagnosis of indeterminate anemia is a hazardous one, to say the least, and should only be made as a last resort. Then the patient should be examined from time to time and every effort made to rule out pernicious anemia and malignancy.

SUMMARY

1. In a series of 1,500 cases of secondary anemia seen at the Mayo Clinic from January, 1918, to August, 1919, 146 presented a hemoglobin of 30 per cent or less and approximately forty-one different conditions were responsible for these 146 cases of severe secondary anemia, cancer of the stomach and uterine fibromyomata being the chief causative agents.

2. In the complete series of 146 cases a red blood count below 1,000,000 was observed in only one patient; the lowest hemoglobin was 10 per cent and the highest color index was 1.0.

3. The blood picture in the patients with cancer of the stomach was always that of a secondary anemia and in none did it simulate the blood picture of pernicious anemia.

4. The presence of a severe secondary anemia should always make one suspicious of a possible malignancy, however, and a normal blood picture should not prejudice against the possibility of a malignancy being present.

5. Cervical polypi may be the cause of a severe secondary anemia and demand surgical interven-

tion, not only for this reason but also because of the possibility of their undergoing malignant degeneration.

6. In all cases of anemia of obscure causation hemorrhoids should be considered as a possible source, but such a diagnosis should be arrived at only after a careful exclusion of other possible causes.

7. Duodenal ulcer is an uncommon cause of severe secondary anemia, occurring in only one-half of one per cent of a series of almost 1,000 cases operated on at the Mayo Clinic.

8. A severe anemia is an extremely rare finding as a result of simple entameba hystolytica infection in the absence of ulceration.

9. With regard to sepsis as a possible cause of anemia, the presence of even marked dental sepsis or of very septic tonsils in a patient with a severe anemia should not prejudice against the possibility of other perhaps much more important factors, the discovery of which is of extreme importance in the ultimate checking or curing of the anemia.

10. Although nephritis is a fairly common cause of anemia, when the latter is severe, however, other factors are probably also playing a part in most cases.

11. The rôle played by lues in the causation of the very marked secondary anemias, for example, with hemoglobin below 30 per cent, is a very minor and infrequent one.

12. Anemia due to nutritional disturbance is fairly common, especially in infants and children. However, other possible causes should be considered and ruled out, especially in the severe anemias, before a diagnosis of "anemia due to nutritional disturbance" is made.

13. Exophthalmic goiter, contrary to the usual belief, is a very uncommon cause of anemia.

14. The injudicious use of radium in the treatment of leukemia may initiate a severe anemia with leukopenia.

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DIAGNOSTIC AND THERAPEUTIC ASPECTS OF BILIARY DRAINAGE*

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A discussion of the value of Lyon's duodenal drainage for diagnosis and therapeusis in diseases of the gallbladder may be brief or long, depending on a discussion of facts or hypothesis. Theoretically, Lyon's method is attractive in that it supplies a much needed aid to the clinician to substantiate a suspected cholecystic disease and obviates the necessity of operation in mild cases of cholecystitis in which the symptoms are distressing, but hardly justify operation. Actually, the diagnostic and therapeutic aid is not so attractive. No doubt all are familiar with the claims set forth in the voluminous, well-written articles which were accepted until careful honest investigation compelled us to reach a different conclusion.

In order to obtain the sequence of colors of bile, light, dark, and light, representing bile from the duct, gallbladder, and liver, the Lyon technic presupposes truth of the suggestion of Meltzer. Crohn says that Meltzer did not claim, but only suggested, that magnesium sulphate might bring into action the law of contrary innervation and cause relaxation of the sphincter of Oddi and contraction of the wall of the gallbladder. Today, proof is not at hand to show that this actually takes place. We could not demonstrate it at operation; of course, general anesthesia may have interfered with a reflex arc; and it cannot be demonstrated in the experimental surgical laboratories. In actual practice, the play of colors is most confusing because the fractional specimens appear irregularly and intermittently instead of in sequence.

The five reasons why Lyon assumed that the dark bile is gallbladder bile are most simply contradicted by a consideration of the bile obtained from the gallbladder at operation. Its physical, cytologic, and bacteriologic properties differ widely from the dark bile obtained by the tube. Bassler does not agree with Lyon in his reasoning with regard to the origin of the dark bile. Dunn and Connell demonstrated the play of colors in a patient deprived of gallbladder and ducts and claim that dark bile simply represents concentration of

magnesium sulphate in the aspirated content. With this my colleagues in the experimental surgical laboratories do not agree. Their work on this subject will be ready for publication soon; it suffices now to say that the dark bile is not an exact representation of gallbladder bile.

The fundamental hypothesis set forth by adherents to the technic that cholecystitis is the result of an ascending infection of the bile ducts from a duodenitis caused by ingested bacteria, does not agree with the most popular idea of the origin of cholecystitis. Cholecystitis is usually of hematogenous origin. The organisms may be from some frank or occult focus and have an elective localization, as proved by Rosenow, in 79 per cent of his experiments, or they may come from an infection of the intestinal tract and set up a primary hepatitis, usually by way of the portal vein or occasionally the hepatic artery. The latter origin is proved by Graham and Peterman, who showed a definite lymphatic communication between the gallbladder and the liver. Their results explain the frequency of simultaneous appendicitis and cholecystitis, for the bacteria of an infected appendix contaminate the portal circulation, causing hepatitis, and cholecystitis develops by way of lymphatic vessels communicating between the gallbladder and liver. Their work is proved experimentally. From operative material, MacCarty emphasizes that cholecystitis does not exist without an associated hepatitis. All of this substantiates the conclusions that cholecystitis is a disease of hematogenous origin and of the wall of the gallbladder. The statement that in cholecystitis the bile is sterile, except in acute cases or in acute exacerbations of a chronic condition, has recently been corroborated by Drennan, of the Mayo Foundation, who found that the bile of only 19 per cent of the gallbladders removed because of cholecystitis contained organisms and, further, *Bacillus coli*, probably a secondary invader, predominated. It is possible to demonstrate further that cholecystitis is a disease of the wall of the gallbladder by demonstrating the organisms in microscopic section or in culture of emulsions of the wall of the gallbladder in cases in which the bile is sterile. Animal inoculation with these organisms causes cholecystitis. In cholecystitis, then, we are dealing with a disease of the gallbladder wall, hematogenous in origin. Fractioned specimens of bile can hardly indicate the condition of the gallbladder wall, particularly since the origin of these specimens is not at all certain and since

*Presented before the Southern Minnesota Medical Association, Rochester, June, 1922.

the bile removed directly from gallbladders obtained at operation fails to give definite diagnostic data.

Examination with Lyon's technic of a few patients leads to false positive conclusions, and examination of a large number of patients to confusion. In proved pathologic conditions, the physical, cytologic, and bacteriologic properties are very bizarre; conclusions cannot be drawn because of the lack of uniformity in the findings, yet if one case only were considered, findings could be interpreted to suit that case. The present value of the Lyon duodenal drainage is its stimulating influence to further study of hepatic and pancreatic function.

If the Lyon procedure is not an aid to diagnosis, what can be expected of it therapeutically? The gallbladder is not drained by this procedure and, besides, the disease is not in the bile, but in the wall of the gallbladder. The injection of vaccines prepared from cultures of the turbid bile is certainly erroneously applied therapeusis and only further abuses the already much abused vaccine therapy. The psychic effect of the Lyon procedure on a neurasthenic patient is often most striking, as is any procedure that gains confidence. Because one of the end-results of a cholecystectomy is a compensatory dilatation of the ducts in which the sphincter of Oddi takes part, so that after cholecystectomy a continuous flow of bile takes the place of the preoperative intermittent flow, nothing can be gained by aspiration of the duodenum after stimulation by magnesium sulphate in those cases in which after cholecystectomy there seems to be a residuation of the original infection causing recurrence of the preoperative symptoms or new symptoms.

To effect a cure of cholecystitis, it seems best to perform cholecystectomy, to remove the primary

focus, whether appendix, tonsils, or teeth, and to build up the patient's resistance to the residual hepatitis, choledochitis, and pancreatitis. Removal of the gallbladder, with or without stones, frees the patient from the greatest cause of immediate symptoms. The removal of the primary infection aids in a general way and inhibits the continuance of hepatitis or choledochitis. Cholecystitis may be temporized with by most any procedure, as may appendicitis; but the cure lies in cholecystectomy as the cure of appendicitis lies in appendectomy, because in these conditions the inflammatory processes are in the walls of the organs.

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EDITORIAL

Minnesota State Medical Meeting

The annual meeting of our Association should be and is, as a rule, the largest medical meeting in the state each year. The meeting at the University in Minneapolis this fall promises to be the largest in the history of the Association and every effort is being made by the local committee of the Hennepin County Medical Society to provide for the entertainment of the visiting members.

It was decided at an early date by the program committee to limit the speakers almost entirely to the Association membership. No reason was seen why we should depart from the time-honored custom which has considered the state meeting to be for and by the constituent members.

The choice of the University campus for the various meetings is particularly happy. We are assured of auditoriums with sufficiently large seating capacities and proper acoustics. The best of addresses loses its value if the listener is uncomfortable and cannot hear what is said.

An interesting feature arranged by the committee in charge of the x-ray exhibit will be the opportunity offered to members to submit interesting films or those of uncertain diagnosis for

exhibition. The committee will take occasion to obtain interpretations from visiting specialists for the benefit of physicians submitting films.

In order to admit the large number of papers submitted to the medical section, the speakers will be limited to the reading of ten minute abstracts. The abstracts at each morning or afternoon session will be read in succession and the discussion will follow. The complete papers will be published during the year in MINNESOTA MEDICINE.

The National Dairy Show meets the same week in Minneapolis and the members are urged to make up their minds to attend our annual meeting at an early date and to make hotel reservations at once. There is no objection to members taking in the Dairy Show in connection with the medical show. The important point is, will you be there?

A Step Forward

Below, appears a resolution relating to expert testimony passed at a joint meeting of the Hennepin County Medical Society and the Hennepin County Bar Association, which was held at the West Hotel, Minneapolis, May 6, 1922. It is to be sincerely hoped that other medical societies and bar associations will follow the laudable example set by these societies.

There can be no doubt but that the majesty of the law and the integrity of two learned professions will become unquestionable in medico-legal matters if the procedure outlined in the resolution referred to can be universally followed.

The customary relationship of the physician as a paid employee of the litigant must be abolished. Unfortunately, there are practitioners in both professions who will prefer to see this relationship continue, a relationship which runs counter to the best traditions of both professions, but which is at least one cause of unnecessarily prolonged litigation and only adds another to the many causes of the miscarriage of justice.

Any means which will remedy these evils should be welcomed by the professions most concerned and by the laity as well. The next step forward should be the enactment of laws to enforce a system such as is outlined in the resolution and the earnest thought and effort of both professions must be devoted toward bringing this about.

RESOLUTION

Joint Committee of Lawyers and Physicians:

1. WHEREAS, there is evidence of a growing dissatis-

faction with the present method of adducing expert medical opinion offered in the trial of civil and criminal actions, and

2. WHEREAS, such dissatisfaction is due very largely to the heavy burden upon litigants for expert advice; the prolonging of trial work; and the uncertainty of outcome and difficulty of settlement due to the irreconcilable conflict in the testimony on the opposing sides of the case, and

3. WHEREAS, this situation has developed to such an extent that comment by the trial courts and also the courts of last resort, and by others having knowledge of the facts, is taking on a character tending to cast reflection upon the skill and integrity of the members of the medical profession and legal profession, and

4. WHEREAS, with a view of correcting this situation in so far as may be practicable, a joint committee of the physicians and the lawyers has been making a study of this subject for the purpose of working out and proposing some concrete plan or method to be used in connection with trial court work as a means to remove as far as possible this dissatisfaction,

5. NOW THEREFORE BE IT RESOLVED by the members of the Hennepin County Bar Association, and by the members of the Hennepin County Medical Society in joint meeting assembled on May 6, 1922, that all physicians competent to qualify as expert witnesses upon the various subjects of controversy in litigation, shall be named annually by the Hennepin County Medical Society, from which number any trial judge, or any one or more of the litigants in any suit, may select a commission of three or more physicians to conduct a joint examination for the purpose of furnishing expert testimony relating thereto,

6. PROVIDED, HOWEVER, that any selection and appointment of any such commission by the court shall be made only upon stipulation of the litigants, and in any case where the litigants cannot agree upon the three names, each side may select one physician with provision that the two physicians so selected may select a third.

7. BE IT FURTHER RESOLVED, that the compensation for any services rendered in making any such examination, or giving expert testimony concerning same, shall be based upon a schedule to be designated by resolutions of the Medical Society and in no case shall the physicians who make such examinations, or give any such testimony, be permitted to know from what source their compensation is derived, such compensation to be payable through the Clerk of the District Court, or if that is not practicable, then through some trustee.

8. BE IT FURTHER RESOLVED, that it is the intention by this procedure to abolish the established relation of paid employee between any litigant and the physician or physicians giving such testimony in order to secure as far as possible impartial and unprejudiced testimony.

9. BE IT FURTHER RESOLVED, that any physician giving testimony in any case under this arrangement shall be subject to cross-examination under the usual rules by any one or more of the litigants in the case.

The following circular was sent with an explanatory note to each member of the society by the president to be filled in and returned for use in making up a list to be recommended to the courts:
HENNEPIN COUNTY MEDICAL SOCIETY EXPERT
CERTIFICATE AND DECLARATION

The present method of obtaining expert medical opinion is unsatisfactory. I therefore believe that the plan as outlined in the resolutions passed at the joint meeting of the Hennepin County Bar and Hennepin County Medical Societies, May 6, 1922, should be followed until some law is enacted that will make it possible for all expert medical opinion to be given by a neutral commission.

I will be willing, under the resolutions adopted by the two societies, to act as a member of a neutral commission on expert testimony in the trial of civil and criminal actions.

Of the divisions of practice hereinafter specified, I am qualified to act as an expert in the ones checked:

- | | |
|----------------------|---------------------|
| 1—General Medicine | 9—Skin and Venereal |
| 2—General Surgery | 10—Genito-Urinary |
| 3—Orthopedics | 11—Obstetrics |
| 4—X-ray and Radium | 12—Gynecology |
| 5—Eye and Ear | 13—Anatomy |
| 6—Nose and Throat | 14—Physiology |
| 7—Nervous and Mental | 15—Pathology |
| 8—Pediatrics | 16—Bacteriology |
| | 17—Chemistry |

I hereby promise to carefully examine and scientifically investigate any case for which I am selected to testify as one of a commission of experts; to give expert opinion only in such branches as I have named, after consultation with other members of the commission; and to give an impartial report or opinion, if cross-examined, according to the best of my scientific knowledge and belief.

(Signed) JOHN DOE.

Following is the resolution relating to fees for expert testimony, adopted by the Executive Committee of the Hennepin County Society:

FEES FOR EXPERT TESTIMONY BY COMMISSION

Be it resolved by the Executive Committee of the Hennepin County Medical Society that the fees for expert testimony by Commission, as per resolutions passed by the Joint Meeting of the Hennepin County Bar Association and the Hennepin County Medical Society, May 6, 1922, be at the rate of \$50.00 for each one-half day, or fraction thereof, consumed per member, as the minimum fee, and the maximum fee to be determined by the responsibility and importance of the case.

—P. W. W.

Northwest Veterans' Neuropsychiatric Hospital

The location of the proposed hospital for veterans suffering from nervous and mental disorders in

District 10 has now been determined. After investigating the merits of various sites offered in the District, comprising the States of Minnesota, North Dakota, South Dakota and Montana, officials of the U. S. Veterans' Bureau, Washington, finally selected St. Cloud. Obviously, there are some points in favor of choosing the larger cities for such a hospital. On the other hand, the smaller city, conveniently accessible to the larger centers, offers advantages not otherwise attainable. Physicians know well that proximity to large centers entails added difficulties in regulating environmental features for the mentally and nervously maimed.

By far the largest proportion of the world war veteran population for District 10 lives in the eastern section and practically forces the selection of such a hospital site in this area. The enterprising St. Cloud community may be depended upon to do its utmost in creating and maintaining always a healthy environment which one naturally hopes for the mentally disabled.

In this connection we might recall how, after the close of the war, the cry against federal waste favored the consideration of employing existing government buildings to care for the disabled veterans. The inadequacies for the ever-increasing numbers suffering from neuropsychiatric disorders became however soon apparent to experts in Washington. Congress finally realized the exigencies and appropriated funds to construct thoroughly modern hospitals. We may rest assured that the institution at St. Cloud will be a model of its kind in structure and equipment; and, more than that, it is the Veterans' Bureau policy to conduct these along the most approved methods possible. Doctors are being trained by providing them special courses of training in the specialty. For instance, at St. Elizabeth's Hospital, Washington, under Doctor Wm. A. White, six months intensive courses are being conducted.

The ever rightly persistent public demand that the war maimed be provided with the best possible care for their recovery or alleviation should insure high standards for the future at St. Cloud. May we not also count on possible new influences upon the profession and the people of our state? The establishment of a psychopathic hospital at the University ought to be broadly regarded as looming quite imperatively in medical horizons of Minnesota in order that the functions of special treatment, teaching and research in neuropsychiatry may be given more adequate facilities. J. C. M.

Hay Fever Desensitization

The hay fever season is on at full blast and now is the time to list cases for pre-seasonal pollen inoculation next year. The average individual waits until trouble comes before seeking relief and perhaps in general such an attitude is a good thing. However, pollen inoculations should be given before the season arrives for the reason that it requires several weeks to produce any effect and the resistance produced is only temporary.

The whole subject of so-called "rose cold" and "hay fever" (both of which terms are gross misnomers) has been greatly clarified by the skin sensitization tests. The physician is now justified in giving preseasonal inoculations of the spring type with timothy and the fall type with ragweed without going to the expense of stocking up with many pollens for carrying out the skin tests. The spring type of trouble is caused in the great majority of cases by the grasses—timothy, June grass and red top. Treatment with timothy will protect against all three. The fall type cases are sensitive to a variety of pollens—ragweed, sunflower, golden glow, golden rod, aster and daisy. Of these the ragweed only has a wind-borne pollen. The ragweed is, therefore, the important plant of the group and its pollen is the only one that need be used.

The various commercial houses are now putting out dilutions in series in such convenient and satisfactory form that the administration is a simple matter. Inoculations should be given preferably at five-day intervals beginning some ten weeks before the symptoms are due and the strength of the dilutions increased so that several inoculations of the one to one hundred strength are given shortly before the season arrives.

Walker reports 40 per cent complete relief in both spring and fall types, and a varying percentage of partial relief, with a very small number in his series receiving no relief.

The desensitization or immunity production, whichever it is, is a temporary affair and pre-seasonal treatment for several years at least is necessary. This fact should be emphasized.

Hay fever sufferers have mucous membranes highly sensitive to many forms of irritation. For this reason it is well to eliminate fresh-water bathing and automobiling. The indoor vase of cut flowers and grasses may well be dispensed with also. Perhaps it would be well to add that nasal irregularity should be very carefully sought for in the hay fever subject.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

MINNESOTA STATE MEDICAL MEETING

The annual meeting will take place at the University, Minneapolis, Thursday, Friday, and Saturday, October 12, 13 and 14, 1922. The Council will meet at 10 A. M. October 12, at Millard Hall, and the House of Delegates will meet at 2 P. M., the same date and place. Registration headquarters also will be at Millard Hall.

The scientific meetings will occupy Friday and Saturday, October 13 and 14, the medical and surgical sections meeting separately, the former in the Animal Biology building, the latter in the Anatomy building except for Friday afternoon, when a joint meeting of both sections will assemble in the auditorium of the Chemistry building.

Clinics for visiting doctors will be held all day Thursday at the University Hospital and the various hospitals throughout the city. Dr. A. T. Mann has general supervision of the clinics.

Exhibits will consist of the following:

1. Commercial exhibits in the corridors of Millard Hall and the Institute of Anatomy. Dr. S. R. Maxeiner has charge of these exhibits.

2. Scientific exhibits consisting of x-ray demonstrations, pathological material, etc. Physicians throughout the state are urged to send in material for this exhibit and should communicate with Dr. K. Ikeda, Minneapolis General Hospital, chairman of this committee. Where a roentgen opinion is desired, the committee in charge will take particular pains to obtain it from visiting specialists for the benefit of inquiring participants. Each film must be labeled showing name of exhibitor, diagnosis and, where desirable, a brief history. Films should be sent directly to the x-ray committee, care of Dr. E. T. Bell, Department of Pathology, University of Minnesota, Minneapolis.

3. Demonstrations by the departments of Pathology, Bacteriology, Pharmacology, Physiology and Experimental Surgery.

Physicians and their ladies are invited to the annual banquet which will be held Friday evening. Some lay speaker of note will address the members following the banquet and further entertainment is to be provided. Dr. G. Elmer Strout is chairman of the banquet committee.

The ladies will be entertained by the Women's Auxiliary of the Hennepin County Medical Society.

Golf tournaments and other forms of entertainment will be provided, and it is suggested that all physicians who wish to play golf on Friday, October 12, send their names as soon as possible to Dr. H. N. Newhart, chairman of the entertainment committee, 910 Donaldson Bldg.

The Physicians Exchange of the Twin Cities will furnish well-organized telephone and messenger service and information booths will be established at the principal downtown hotels. Dr. Paul Giessler has charge of this particular activity. Lunches will be served at the Men's Union building on the campus on the convention days.

Important! The National Dairy Show is to meet in Minneapolis, October 7 to 14 inclusive. Visiting physicians should therefore make their hotel reservations as soon as possible either directly or by communicating with Dr. E. L. Gardner, 730 LaSalle Bldg. or Dr. S. G. Reynolds, 816 LaSalle Bldg., Minneapolis.

Following appears a list of local committees:

Committee on Arrangements—Dr. E. L. Gardner, Chairman; Dr. Horace Newhart, Dr. J. C. Litzenberg, Dr. W. R. King, Dr. A. T. Mann, Dr. Nimrod Johnson, Dr. P. W. Giessler, Dr. A. E. Smith, Dr. A. F. Schmitt.

Committee on Exhibits—Dr. S. R. Maxeiner, Chairman; Dr. J. B. Carey, Dr. S. M. White.

Scientific—Dr. E. T. Bell, Dr. J. S. McCartney, Dr. W. A. O'Brien, Dr. C. M. Jackson.

X-Ray—Dr. K. Ikeda, Chairman; Dr. R. W. Morse, Dr. F. H. K. Schaaf, Dr. A. W. Desjardins, Dr. T. R. Martin.

Commercial—Dr. S. R. Maxeiner, Chairman; Dr. F. J. Souba, Dr. H. M. Lee.

Committee on Banquet and Entertainments—Dr. G. E. Strout, Chairman; Dr. O. S. Wyatt, Dr. C. E. Willcutt, Dr. F. J. Souba, Dr. Ivar Sivertsen, Dr. T. H. Sweetser, Dr. L. M. Lajoie, Dr. E. R. Hare, Dr. E. D. Anderson.

Committee on Hotel Accommodations—Dr. G. E. Benson, Dr. G. E. Thomas.

Committee on Publicity—Dr. A. E. Smith, Chairman; Dr. W. A. Jones, Dr. C. B. Drake.

THE AMERICAN ACADEMY OF OPHTHALMOLOGY

The Minnesota Academy of Ophthalmology and Oto-Laryngology will entertain the members of the American Academy of Ophthalmology and Oto-Laryngology at its annual meeting, which this year will be held at the University during the week beginning September 18. This is the first occasion that the Twin Cities have been the meeting place of the national association and every effort is being made to make the meeting a success from both the scientific and social standpoints.

It is expected that there will be an attendance in the neighborhood of 1,000 specialists from all over the United States and Canada. Headquarters will be located at the Radisson and St. Paul Hotels, but all the scientific meetings will take place on the University campus. It is the intention to have one large joint evening meeting, which will be open to the public at one of the theaters in Minneapolis. The mornings and afternoons of Tuesday, Wednesday and Thursday of the week will be devoted to scientific meetings to be held in the building of the Men's Union on the campus.

The attention of the members of the Minnesota Academy is particularly called to an intensive course of instruction, which will occupy Friday and Saturday. The course will consist of lectures by eminent authorities in their particular subjects, such lectures to occupy from thirty minutes to an hour. These lectures will continue throughout both days. It will be absolutely necessary for those interested to communicate with Dr. John Morse, secretary, 503 Don-

aldson Building, Minneapolis, in regard to any requirement in the course.

The social side of the program has not been neglected and Wednesday afternoon and evening will be devoted particularly to recreation in the form of automobile rides, golf, steamboat rides over Lake Minnetonka, ending up with a dinner and dinner dance at Radisson Inn, Christmas Lake. For Friday evening a smoker in St. Paul is planned.

A very excellent commercial exhibit will occupy the main floor of the Men's Union building on the University campus during the entire period of the meeting. Representative exhibits will be displayed by leading instrument makers and dealers from all parts of the country.

Arrangements are being perfected whereby Professor Robert Barany, formerly of Vienna and now of the University of Upsala, Sweden, will be the guest of honor at this meeting of the American Academy of Ophthalmology and Oto-Laryngology. He comes especially to read a paper presenting his new method of radical operation for chronic ear suppuration. During the two weeks immediately following the session of the Academy, Dr. Barany will conduct under the auspices of the Minnesota Academy of Ophthalmology and Oto-Laryngology a special post-graduate course in Otology.

SOUTHERN MINNESOTA MEDICAL ASSOCIATION

The annual meeting of the Southern Minnesota Medical Association will convene at Mankato December 4 and 5, 1922. There will be an afternoon program Monday, December 4, a Physicians' and Surgeons' Banquet and Smoke Monday evening, December 4, and a day session Tuesday, December 5.

The papers will be limited to ten minutes—no discussions, to allow for more papers. Papers will be presented by physicians and surgeons practicing in Minnesota, with one or two exceptions.

The report of the midsummer meeting of the Southern Minnesota Medical Association at Rochester, June 19 and 20, which appeared in the July number of MINNESOTA MEDICINE, stated that the attendance was under 300, thus giving an incorrect idea of the exact size of the meeting. It is with the desire to correct this impression that attention is called to the fact that there were 387 registrations at this meeting and that the checking of all those present who did not register brought the total number of visitors well over the 600 mark.

STEARNS-BENTON COUNTY MEDICAL SOCIETY

The Stearns-Benton Medical Society held their annual picnic at Pelican Lake, July 18. A fish fry was the main feature of the picnic.

Officers for the coming year of the Stearns-Benton Medical Society, who were elected at the last meeting, are: Dr. T. Watson, Albany, president; Dr. J. P. McDowell, St. Cloud, vice president; Dr. J. N. Libert, St. Cloud, secretary-treasurer; Dr. W. L. Beebe, St. Cloud, delegate to state convention; Dr. H. B. Clark, St. Cloud, alternate.

COMMUNICATIONS

A LETTER FROM VIENNA

The present situation in Vienna is somewhat turbulent. One man's guess is as good as another's, but it is only a question of time until some outside influence must come in to allow the ordinary economic channels to be restored and the people to live naturally. The financial plan of endless printing of worthless money goes on apace. It was freely stated that this would stop as soon as the cost of paper and printing became greater than the face value of the notes. Thus, like many other economic reflections, the results of the war have proven erroneous; the money presses will run as long as they are fed and manned, and Austria is still some distance behind Russia in money production. Street car rides that cost forty kronen in March, 1922, now cost three hundred and fifty. Bread costs have gone up proportionately; and bread continues to be the standard nourishment of the masses—few buy fats or much meat.

Strikes are present and others imminent; it is not so much a question of higher wages, but lower food costs.

In this situation foreign visitors are numerous and carry various financial media that are very acceptable to the natives. But with what result? The well-stocked stores and restaurants are for them; they virtually bid for the materials and prices are gradually and inevitably raised for the local people. As the situation has become more and more unstable, the kronen has depreciated, so that it is now worth only about twenty thousand to the dollar. While the visitors are a godsend to the banks and to the merchants, they are one of the factors which make the common lot very unhappy.

Yet, Vienna is outwardly very natural and, as usual, "happy." The many old medical friends of Vienna would find, at least at this fruitful period of the year, very little to suggest the "Inferno" which has been experienced. They were never a boastful people, and in the hour of adversity they are not complaining. To direct questions they answer directly: Wilson's "principles" raked them of both territory and honor; France's fear of German strength forbids any political or economic union with Germany; they didn't want war and were forced into it by Russia; Germany is credited with having *prolonged* the hideous war.

There have been a few recent severe critics of medical instruction and opportunities in Vienna. I do not wish to make the mistake of equally rash judgment, and hesitate to send any information based upon as short a visit as I am making here. However, I must state that there are at least 125 medical men here at present and they are an almost exact replica of the group I saw here and worked with ten years ago. Considerably over one-half are studying eye, ear, nose and throat; the other specialties and general medicine are fairly liberally represented. Canada, South Africa, the British Isles send a moderate number; all are rallied in a fine camaraderie, the result of their common purposes and desires.

The old Vienna A. M. A. went to pieces some time ago with a grand turmoil quite like that experienced by us in 1912, and spoken of by the older men as a not uncommon experience. A new set of officers has been elected with a Minnesota man, John Gelz of Richmond, as president. As usual, there is a much larger quota of Minnesota men here

than from any other single state. This is curious and reflects either the greater tendency on the part of Minnesota doctors to take graduate work, or a greater love and belief in the clinical opportunities of Vienna.

Dr. O. W. Scholpp of Hutchinson has been here for some months and he and a group aggressive like him have been getting splendid work, in the same characteristic dynamic manner as has always characterized the varying percentage of Americans abroad who were really out for work. These men have been putting in long days with courses up to nine and ten o'clock at night. Much freer use is being made of some of the outlying hospitals than formerly. Stoerck, in addition to his position in the Allgemeine, is pathologist to the "Trieste" hospital. He has a large group doing pathology with him three times a week. Several men, including Dr. Jones of Minneapolis, told me the gynecological opportunities were unlimited. I went by invitation to one of Prof. Fraenkel's lectures and he was just as fascinating as usual. Tandler, despite his official connection with the local parliament as presiding officer, is inspiring, as before, men earnest in preparation for surgery. I noticed these men buying very freely of the recent remarkably illustrated anatomical works. This is a great opportunity to build up a fine library for those equal to a tussle with the German language. It is to be hoped that the study of German will return in our schools, because it has a very rich medical literature, as every one knows. Von Eiselsberg has been operating daily. Whatever else may be said about some of the features of their technique and their nursing training, some of our operating room nurses should watch the nurse who hands him his ligatures and instruments. She is almost uncanny in her promptness.

Is Vienna the medical center that it was before the war? Is it a good place for Americans to go now? The old morgue room in the Krankenhaus is cleaner and sprightlier than it has ever been before, thanks partially to the Rockefeller Foundation. Erdheim is sectioning and demonstrating on the same old stone table used by Rokitsansky. They have 65 to 70 per cent of the material they had formerly, and have the same amazing variety. He is capable of giving better courses even than he gave before. Old Theodore is dead but the autopsy material is worked up so that it is absolutely like everything else in Vienna—artistic; it is like rare hand-made lace. Nothing is torn and disturbed. The gross pathology opens up like the pages of a beautifully bound book. The men are not all taking advantage of this classical and unique Vienna opportunity, but this is a neglect due to the fact that the men have been diverted to taking more practical courses. In due time the Corrected Blue Book will be published; the strikes and uncertainties will become history; an outside protectorate will develop and men and their families may come here freely. I may say that I have conversed with many men, both recent recruits and "old timers" here in E. E. N. & T., and all are abundantly satisfied. Dr. W. L. Colby of St. Paul reported to me, as did Dr. Wm. Hinz of New York, very favorably on the work available in pediatrics. While many courses are offered in English and some have been given long enough to attain great smoothness, it is far better to blunder badly into the German language. It is a virile speech and has already withstood most heroic punishment at the hands of some of us interested not in what the language is, but what

it gets us. As always, the whole spirit of the Viennese is friendly; for many generations they have featured the complementing arts—music and medicine.

Desiring a memorial on the occasion of the fiftieth anniversary of Franz Joseph's reign, they erected the beautiful Jubilaum's Hospital in 1912. It is a magnificent combination of architectural beauty and scientific modern equipment. It is as typical of the medical interest of the people as are their numerous theatres and concert halls expressive of their music.

Anarchy may come in our own country; it is freely talked of in Italy, and is a decided possibility here. Watch the coming winter and keep in touch with the Vienna A. M. A. Study Bertha Lewis' books (she now has several in varying specialties—the outgrowth of her appreciated "Vade Mecum"). If all goes well by next March, take my word for it: do not hesitate to come to Vienna for medical study.

—E. L. TUOHY.

Munich.

Dear Dr. ———:

The postal authorities have come to the conclusion that there must be some one by the name of Williams in this part of Europe. We have been receiving mail with practically every delivery so we know that we are not forgotten by the folks we have left behind. It takes on an average about two weeks for mail to reach us from the Twin Cities, which is not bad considering the amount of handling it requires and also certain obstacles which are evidently common to both continents such as "strikes." We see an American paper occasionally which gives us some of the details in regard to the miners' and railroad strike. Over here, we have the dock workers on a strike, so that interferes to a certain extent with the mail. The barbers' union held a meeting last night, but up to the time of writing have not heard as to the effect upon the public. From the appearance of two different "sects" over here, the barbers do not have much to do. One sect appears to receive "home treatment" such as I used to get every summer. Their hair is clipped tight, not even around a bowl. The other sect must have made some sort of wager on the outcome of the war, for it is clearly evident that their hair has not been cut since the armistice. This type also must have a boycott against the tailors' and shoemakers' unions. They wear knee pants—no stockings—sandals on their feet and some wear a shirt without a coat and others vice versa.

I have been rather fortunate during the past week or so in getting in touch with some real good physiological chemistry. Dr. Boehm, one of Muller's assistants, is working on the blood with the view of obtaining some means of an early diagnosis in cancer, also as a check on the roentgen therapy. He has obtained some very satisfactory results during his year of research, but is not ready to publish them. He wants to work up his series a little more thoroughly.

The German medical profession seem to be working on three or four main ideas. I make this statement from my own personal observation and a review of their literature. Cancer at present is being thoroughly investigated. The German is trying his best to attach a bacterial etiology

to it. Early diagnosis and roentgen therapy seem to be the main features. Tuberculosis comes in for its share. There are several groups of investigators who are combating among themselves on the question of immunology in tuberculosis. Koch's followers at present are somewhat in disgrace because of a new test based on the "Allergy theory"—that is, using a vaccine containing the so-called "Tuberculin albumen." To me, from the review of some 50 cases here in the hospital, this gives much more satisfactory results.

Syphilis is the one subject that is always a topic of discussion. The number of tabetics one sees here on the street is appalling. The various types of treatment are about as numerous as there are investigators. The Wassermann test is being modified in numerous ways.

Endocrinology has secured quite a hold here both in Germany and in Austria. Professor Biedl of Prague, who spoke here a short while ago, is the main promoter and he has some very good proofs of his theory. As to the "monkey glands," there is more in the newspapers. An interesting factor that I had brought to mind was in the extirpation of the thyroid. The surgeon always examines the specimen to determine whether or not the parathyroids have been removed. If they have, he immediately transplants them into the tissue of the neck. As to their potency thereafter, there is some doubt in my mind because there is always the possibility of some aberrant glands. But, however, he laid considerable importance on this procedure, as in over 1,000 cases they had only 5 cases of tetany.

Adrenalin seems to be a cure-all for everything. It is given in bronchial asthma, in diabetes mellitus and insipidus, also in tetany and even in hermaphrodites. The therapy used here is very similar to that in the states except that there is a much larger number of patent medicines used.

Our stay in Munich is just about half over and after the first two weeks has been very pleasant and practical. We have made arrangements for rooms in Zurich. * * * The original plan was to spend most of our time here in Munich with the cheaper living conditions, but that has been denied us, so the only thing we can do is to leave for the United States. We plan to remain in Zurich until the middle of November and arrive in the Twin Cities around Christmas.

We are enjoying the best of health and the weather is delightfully cool. An overcoat is not out of place anywhere after 6 o'clock in the evening. I wish we could exchange with you for some of your good old Minnesota summer.

Best regards to all. * * *

As ever,

C. K. WILLIAMS, M.D.
(St. Paul)

Munich, July 26, 1922.

Dear Dr.———:

We are still in the land of "Beer and Pretzels," and it is well named, for it is an everyday sight to see members of all walks of life eating them. They buy them the same

as the Americans buy chocolate and we have adopted that custom, too.

Last Saturday we took in the "Gewerbeschau," which is very similar to our State Fair, but much more beautiful. There are on exhibition everything from a railway train to artificial limbs, fine pieces of hand-made lace to life-size model houses. This exhibition lasts from May until October. As I started to say, we "did" this in regular German style, that is, taking our lunch in a paper bag and going to the beer hall and ordering a stein of beer. They, the restaurant people, are certainly imposed upon. You can occupy a table all afternoon on the strength of one order of a single cup of coffee or a stein of beer. Another interesting feature is that they never render a bill. You have to call and insist upon paying it. Furthermore they allow you to figure it out, that is, state what you have had. It seems to me that they rely too much on one's honesty. I don't imagine our friend . . . would adopt their system and make money very long.

Last week we visited one of their famous museums, the Deutsches Museum, and that certainly is a novel institution. They have rooms upon rooms full of all types of inventions from a microscope to a printing press, showing all the steps in the development of each article. The most wonderful of all is the salt mine in the basement. They have halls and galleries with all the implements, including compressed air drills, electric cars, stables for horses and first aid stations. They have a room devoted to optics, one to acoustics. Here, one could almost take a course in eye and ear. We spent two hours there one afternoon and three the next and then we did not see it all. All this comes for the price of 5 marks (4.5 marks to the cent).

We see by the papers that the United States is having its labor troubles as well as Germany. There are numerous rumors of a general strike here, but so far everything is peaceful. The railroads, telephone, telegraph and post-office are all under the government, so that helps a little. Another thing favorable to us is that Bavaria is not in sympathy with the unrest in the rest of the Germany Republic. We were informed the other day that our reception was much better than that given to a Prussian, so that has some advantage.

The University is just about to close for the summer, and the senior students are all preparing for their examinations. Also they are all blossoming out in black frock coats with gray striped trousers, which is the garb of the graduating class.

Lately I have been thrown in contact with several of the internes and have seen "behind the scenes," so to speak. They have the fundamentals well drilled into them, in fact, probably too much, as they have little confidence in their own ability. No one over here thinks of writing a prescription. All their therapy is taken from a "Rezepttashenbuch," which has hundreds of prescriptions all numbered and they order their medication by number. This is partly due to the high price of drugs and these prescriptions are the cheapest form of medicine. Another feature I noticed was the large number of patent medicines used. Many of these are gradually being introduced into the United States. The large medical houses oftentimes furnish the various clinics

with large quantities of their preparations for the privilege of using the name of the doctors, and in this way these preparations are made known to the internes and students, who, rather than think out a prescription, merely order the original package, etc.

I am enclosing an extract of an article which to me is rather interesting, and which shows more or less the general trend of medical research. One of the professors here is working on the same subject and I expect that his results will more or less verify these. . . .

As ever,

CLAYTON K. WILLIAMS.

EDITOR'S NOTE: The above communications are of particular interest taken in conjunction with each other and as an indication of the attitude of the post-war authorities in Austria and Bavaria towards foreigners. Every effort has been made and is being made to induce foreign medical men to do post-graduate work in Vienna: not so in Germany. Before the war, Munich attracted quite a number of American medical men, internists particularly, Professor Frederick Muller being the chief attraction. Shortly before the war the large number of Russian medical undergraduates attending the clinics in Munich presented a difficult problem to the school authorities. The few Americans were welcomed to the lectures, no charges were made, the usual courtesies between members of the profession were extended and the commercialism which had been developed in Vienna was frowned upon. It should be stated, however, that the organization of the post-graduate work for foreigners in Vienna, for the most part Americans, was formed by Americans for the mutual advantage of local men and visitors. It was generally felt that the fees were quite reasonable. In this connection it is interesting to note in the last announcement of post-graduate courses in Vienna that the enrollment fee for Austrians is 3,000 K, for Hungarians, Poles, Russians, etc., 15,000 K, and for other foreigners, 30,000 K. This discrimination may be irritating to some and yet a registration fee of 90 cents (rate—3 cents for 1,000 K) is not particularly exorbitant.

MEDICAL REGISTRATION IN MINNESOTA

Editor of MINNESOTA MEDICINE:

In your August issue, under items "Of General Interest," you quote statements purporting to be made by the two Medical Regents of the University regarding the registration of students in the Medical School. I do not know about the authenticity of the statements quoted, but the facts and figures stated are so broadly in error that they should stand corrected before your readers.

Dean Lyon's recent address before the Hennepin County Medical Society, entitled "The Medical School, the Medical Profession and the Public Welfare," printed in the *Journal-Lancet* of August first, refers to some of the questions at issue; but it may be assisted by a definite recital of the statistics of registration for the coming Fall quarter.

It is stated in your columns that there are 250 "pre-medics" seeking admission to the Medical School. Actually, 197 applications, including students of the University the State, and some few from colleges outside the State, pre-medical course, students of other academic colleges in have been received.

It is stated in your item that only eight of the 250 alleged applicants have been admitted. This is manifestly a typographic error, but none the less misleading to the uninformed. Doubtless it was meant to read "eighty," which is the registration limit set, for some years past, by the Board of Regents. As a matter of fact, however, the Administrative Board of the Medical School, anxious to strain the school's possible capacity to the utmost, has recommended the registration of 100 new students and, to meet the possible occurrence of vacancies in the list, has provisionally accepted seven others. All the students of this group have satisfactorily completed the entrance requirements of the School.

Of the remaining 90 students, who failed of acceptance under this enlarged limit of registration, 22 were residents of other states; to whom, even though some of them have made good preparation, the University does not have the same obligation that it bears to its home students.

Of the remaining 68 Minnesota applicants, all were deficient in entrance requirements in one way or another. It may rest unchallenged that even the need of more doctors, and the need is purely hypothetical in this State, should not dictate a diminution of the standards of fitness. Those standards are the product of a generation of experience in medical education.

It is unquestionably true that the State is obligated to educate in medicine Minnesota students whose preparation argues them initially fit and whose earnestness of purpose suggests a well-developed desire for education. The University assumed that obligation when it agreed to the unification of medical teaching under the control of the State in the year 1908. It has fulfilled the obligation only in part. It is possible of fulfillment as a whole.

It is safe to say that it cannot be done by the expedient of a double shift of students. This would be a costly device and would only make bad matters worse. It would necessitate more full-time teachers and they are not easy to get. It would demand a larger contribution of hours from part-time teachers, most of whom would be unwilling to give it. It would necessitate more equipment and added laboratory space, both of which are badly enough needed now. It would mean more hospital beds, for which the school has been crying these many years. Aside from building costs, it would call for an increase of budget, probably equivalent to the interest on the building costs.

And the solution of the whole problem is so simple a one anyhow. The building costs must be incurred sooner or later. Incur them now. The Medical School, the Medical Profession and the Public, the three parties in interest, to whom the Dean's address refers, would stand back of the permanent investment, when they would not approve any more temporary expedients.

With the wings of Millard Hall and the Institute of Anatomy completed, with the University Hospitals' capacity increased to 550 beds, the Medical School can fully perform its function in the education of an adequate number of physicians; it can maintain the quality of that education for which its faculty has always stood; and it can keep its place in the front line of the teaching institutions of medicine in the country. It is probable that the Board of Regents has no obligation greater than this.

RICHARD OLDING BEARD.

OF GENERAL INTEREST

Dr. J. M. Fisher, formerly of Virginia, has located at St. Peter.

Dr. E. A. Olson, formerly of Cook County Hospital, has located in Duluth.

Dr. Arne Oftedal of the Fargo Clinic is spending his vacation in the Twin Cities.

Dr. and Mrs. E. L. Tuohy of Duluth have returned from an extensive trip to Europe.

Dr. G. H. Walker of Fairfax has sold his practice, which he will relinquish October 1.

Dr. G. I. Badeaux of Brainerd recently returned from a short trip to Portland, Oregon.

The Northwestern Pediatric Society held a meeting in Rochester Saturday evening, July 22.

Dr. and Mrs. E. H. McIntyre of Virginia have returned from a motor trip to the Twin Cities.

The Board of Regents of the University of Minnesota held a meeting in Rochester, July 10.

Dr. A. A. Deslauriers of Duluth has moved to Florida, where he will operate his fruit ranch.

Dr. George C. Doyle is now associated with Dr. C. L. Haney and Dr. O. E. Heimark at Duluth.

Dr. A. E. Williams has given up his practice at Backus and has located at Fall Creek, Wisconsin.

Dr. and Mrs. J. S. Shrader of Springfield have returned from a week's tour of northern Minnesota.

Dr. and Mrs. George L. Merkert of Minneapolis have returned from a three weeks' trip on the Great Lakes.

Dr. T. H. Sherman, of Franklin, has just returned from a two weeks' trip through the northern part of the state.

Dr. and Mrs. H. T. McGuigan of Red Wing arrived home the latter part of August from a summer spent in Europe.

Dr. Carl Johnson of Dawson visited friends at Moorhead on his way to Pelican Lake, where he is spending a few weeks.

Dr. and Mrs. John L. Haskins of Morgan are the proud parents of an eleven-pound daughter, who arrived August 8.

Dr. and Mrs. Henry Binger of St. Paul visited with friends in Duluth prior to taking a lake trip to Buffalo in August.

Dr. W. Ray Shannon has announced the removal of his office from the Hamm building, St. Paul, to 550 Lowry building.

Dr. and Mrs. F. H. Dubbe of New Ulm have returned from a ten days' trip to Duluth, Port Arthur and other lake points.

Dr. E. J. Hynes, Tower, has returned from Chicago and has resumed his position as attending physician at the Soudan hospital.

Dr. Earl J. Bratrude, who recently completed his internship at the Minneapolis General Hospital, has located at Sacred Heart.

Dr. and Mrs. E. H. Frost of Willmar have returned from a month's trip to Glacier Park, Spokane, Seattle, and other western points.

Dr. and Mrs. Horace Newhart of Minneapolis have returned from an extended motor trip through the northern part of the state.

Dr. Frederick Eberson, of New York, is temporarily associated with the staff of the Section of Dermatology at the Mayo Clinic.

Dr. Charles E. Caine of Morris has been appointed by Governor J. A. O. Preus as a member of the state board of medical examiners.

Dr. Henry Takacs has left Hitterdal, where he has been practicing for the past four months, and has located at Taylor, North Dakota.

Dr. Hugh Reynolds has taken charge of the Nashauk hospital during the absence of Dr. M. F. Hayes, who is absent on his vacation.

Dr. and Mrs. John F. Fulton, of St. Paul, have announced the engagement of their daughter, Louise A., to Richard Relf of that city.

Dr. R. C. Hunt, who has been resting and recuperating for some time at the St. Paul sanatorium, has returned to his practice at Fairmont.

Dr. P. A. Schmidt, formerly of Good Thunder, has taken up his practice at Renville, where he will be associated with Dr. E. M. Clay.

Dr. H. G. Lampson of Nopeming with his son and daughter recently took a four days' hiking trip from Buyek to Ely over the Echo River trail.

Dr. and Mrs. O. J. Baldwin of Chisholm have returned from a two weeks' motor trip to Rockford, Illinois, and other points east of Minnesota.

Dr. G. D. Murphy of Keeline, Wyoming, formerly of Murdock, Minnesota, has returned to Murdock for the practice of medicine in that locality.

According to report from physicians in the Red River Valley district, crop conditions there are quite hopeful and the yield will be at least a fair average.

Miss Edith Higley, who has been a fellow in Clinical Bacteriology in the Mayo Foundation since September, 1920, has left for her home in Waukegan, Illinois.

Dr. O. W. Scholpp of Hutchinson has returned from Vienna, Austria, where he has been engaged in medical studies and research work for the past four months.

Dr. J. B. Claire of Winsted has returned from Minneapolis, where he had been taking treatment for his knee, which he injured some time ago while cranking his car.

Dr. and Mrs. A. C. Baker and four children of Fergus Falls are enjoying an automobile trip to Pittsburgh, Washington, D. C., and points in New York and Massachusetts.

Dr. Edward Vernon Martin announces the opening of an office for the practice of surgery at 620-621 Wall Building, Vandeventer Avenue and Olive Street, St. Louis, Missouri.

Dr. James H. Farrage, formerly of Winnebago City, has opened his offices for the practice of medicine in Santa Ana, California, where he will specialize in the diseases of women and children.

Dr. M. J. Fardy, who has completed a three years' fellowship in surgery, in the Mayo Foundation, left August 4

to motor to North Dakota, where he will be associated in practice with Dr. Devine.

Dr. and Mrs. A. L. Baker of Kasson have returned from an automobile trip to Benson and other points in the western part of the state. They were guests of their daughter at Benson for two weeks.

Dr. C. A. A. Joshlyn of Mankato has retired from practice and has moved to Dodge county. Dr. Joshlyn located in Mankato in 1877 and maintained an office at 304 South Front Street for many years.

Dr. J. A. Thabes of Brainerd has been appointed by Governor J. A. O. Preus as a member of the State Board of Health to fill the vacancy caused by the resignation of Dr. Egil Boeckmann a short time ago.

Dr. A. E. Nichols, of St. Paul, has been recently appointed chief deputy city health officer to succeed Dr. J. S. Abbott, who has resigned. Dr. Nichols has been a medical inspector in the bureau for several years.

Dr. I. H. Kiesling, of Nashwauk, was recently elected a member of the Nashwauk-Keewatin school board. Dr. M. F. Hayes, of Nashwauk, and Dr. E. H. Loeffel, of Keewatin, were re-elected school physicians.

Dr. and Mrs. Thomas R. Watson have returned from a month's stay in Toronto, Canada, where Dr. Watson visited with a sister whom he had not seen in 38 years. The trip to Toronto was made over the Great Lakes.

William Coventry, son of Dr. and Mrs. W. A. Coventry of Duluth, is a member of the crack senior crew of the Duluth Boat Club which recently won every event entered at the National Regatta held in Philadelphia.

Dr. W. A. Allen, of Rochester, was cited in a home newspaper recently as being the oldest practicing physician in the state. Dr. Allen has passed his eighty-eighth year and is still very active in his profession.

Dr. and Mrs. Herman Linde of Cyrus have returned from a honeymoon trip through Yellowstone Park and other points in the west. Mrs. Linde was Miss Inga Hippe of Cyrus before her marriage, which occurred June 27.

Dr. Alberta F. M. Greene has given up her position as staff physician at the Fergus Falls State Hospital and has taken up her duties as assistant superintendent of the New York Reformatory for Women, Bedford Hills, N. Y.

Members of the Nicollet-LeSueur County Medical Society and their families held their annual picnic at Lake Jefferson Thursday, August 3. Boating, fishing, swimming and other outdoor sports formed the day's entertainment.

Dr. E. P. Cathcart has completed a one year's Special Fellowship in Dermatology and Syphilology in the Mayo Foundation and has gone to St. Francis Hospital, Pittsburgh, for one year. He expects to return to the clinic July 1, 1923.

The marriage of Dr. Douglas S. Corpron, son of Dr. William Corpron of Yakima, Washington, who formerly practiced at Slayton, Minn., and Miss Grace Chapman of Redwood Falls, was solemnized at the home of the bride's parents, July 12.

Dr. J. J. Gelz of Richmond, who is spending a year in Europe, has been made president of the American Medical Association in Vienna, Austria, where he is located at

present. Dr. Gelz will go to London this coming winter to specialize in eye work.

Dr. D. Parham, who has completed a three years' fellowship in surgery in the Mayo Foundation and received the Degree of Master of Science in Surgery, June 14, 1922, has left the clinic and has gone to the Woman's Hospital, New York City, New York.

Work has begun on a new office building which Dr. C. I. Oliver of Graceville is erecting for himself and Dr. J. M. Arnson of that city. The edifice will contain on the ground floor three office rooms, a reception room, x-ray room and developing room, laboratory and record room.

Dr. R. Fitz, who has been Professor of Medicine in the Mayo Foundation and chief of a medical section since August 15, 1920, has left the clinic to become Associate Professor of Medicine at Harvard University and Visiting Physician at Peter Bent Brigham Hospital, Boston.

Dr. D. B. Pritchard, Dr. E. M. McLaughlin, and Dr. L. W. Steiner, all of Winona, have been appointed by Dr. Hans Lichtensteiner, president of the Winona County Medical Society, as representatives of that county on the legislative committee. Dr. Pritchard has been named chairman.

Dr. A. S. Hoiland has returned from New York, where he spent a year in post-graduate work, and has opened offices in the Masonic Temple, Minneapolis, for the practice of medicine, specializing in diseases of the eye, ear, and throat. Dr. Hoiland formerly had his practice at Argyle.

Dr. and Mrs. W. J. Mayo, Mr. and Mrs. J. H. Kahler and daughter, Mary, Mrs. M. H. Mellish, Mr. C. P. Joy and Miss Lilia Joy, of St. Paul, have returned from a three weeks' motor trip to Yellowstone Park. From Yellowstone Park they went to Estes Park, where they visited Dr. and Mrs. Balfour.

Dr. P. W. Wiperman, executive officer of the Asbury Veterans' Bureau hospital of Minneapolis, received notification the latter part of July of his transfer to the Veterans' Bureau hospital at St. Louis, Mo. Dr. Wiperman assumed his duties as medical officer in charge of the St. Louis hospital in August.

Dr. H. M. Knudson has returned to Pipestone to resume his practice after a several months' absence spent in the University Hospital, Minneapolis, followed by a visit to his former home in Hunter, N. D., for recuperation. Dr. Knudson has severed connections with the Pipestone clinic and has established offices for private practice.

Dr. Ross Gamble, who for the past year has served as an interne at Walter Reed hospital, Washington, D. C., together with his brother, Dr. William Gamble of the Veterans' Bureau, Minneapolis, spent several days last month at their former home in Rochester. A third brother, Paul Gamble, is now in his junior year of medicine at the state university.

Dr. and Mrs. Donald D. Van Slyke, of New York, visited the Mayo Clinic July 26. Dr. Van Slyke is a member of the Rockefeller Institute and is in charge of the Experimental Laboratory on the chemical side. Dr. and Mrs. Van Slyke are on their way to China, where Dr. Van Slyke will participate in teaching, for six months, at the Medical School at Peking.

Dr. Robert E. Farr and Dr. Stanley R. Maxeiner have moved into their new offices at 1645 Hennepin Avenue, Minneapolis, and are now practicing under the name of the Surgical Clinic of Minneapolis. The new offices, which comprise the third floor of a large office building, are equipped with every modern convenience for the practice of medicine and surgery.

Dr. John W. Tipple, former executive officer to Dr. H. B. Fralic, medical officer in charge of the Aberdeen hospital for war veterans in St. Paul, left last month for Memphis, Tennessee, where he is to have charge of a new hospital for disabled veterans. Dr. Tipple has been medical officer at the Aberdeen hospital since it was opened in 1921. No announcement of his successor has been made.

The Public Health Building at the Minnesota State Fair.—Unique exhibits and entertainment features are being planned by seventeen public health agencies of the Twin Cities and the Northwest for the purpose of educating visitors to the Minnesota State Fair in matters of health. This is the third year that a special building has been set aside at this fair for public health activities, and the Minnesota State Fair board was the first board of its kind in the United States to create a special department of public health for a state fair. Dates for the Minnesota fair are September 2-9.

Education of both parents and children in child hygiene will be largely emphasized. There will be a \$500 children's prize contest for healthful mouths and good teeth, entertainments by a "Toothbrush Man" to impart lessons in oral hygiene, a storekeeper who exercises his discretion in the kinds of foods he will sell to children, an exhibit to illustrate the value of physical inspections of rural school children, a series of child health plays, and a 12-panel exhibit on child feeding and training.

The exhibit of the Minnesota State Board of Health will put into layman's language the facts he should know about preventable diseases, sanitation with reference to milk, water and sewage disposal, venereal diseases, vital statistics, and child hygiene with particular reference to Minnesota's participation in the provisions of the Sheppard-Towner bill. The need of legislation for higher standards of nursing education will be emphasized in the exhibit of the Minnesota State League for Nursing Education.

Organizations participating in the exhibits and entertainment features of the health building are the Northwest Pediatric Society, the American Red Cross, the Minnesota State Board of Health, the Minnesota Public Health Association, the Minnesota State Dental Association, the Minnesota State Sanatorium Advisory Commission, the Minnesota State League of Nursing Education, the Twin City Industrial Nurses, the Minneapolis Health Department, the Hennepin County Public Health Association, the Hennepin County Tuberculosis Association, the Minneapolis Infant Welfare Society, the Minneapolis Visiting Nurse Association, the St. Paul Baby Welfare Society, the Wilder Charity Nurses of St. Paul, the Ramsey County Public Health Association, and the Hennepin County Rural Public Health Nurses.

Communications may be addressed to Mr. Ival McPeak, Director of Health Publicity, Minnesota State Fair, 89 South Tenth Street, Minneapolis.

NEW AND NON-OFFICIAL REMEDIES

During July the following articles have been accepted by the Council on Pharmacy and Chemistry for inclusion in New and Non-official Remedies:

THE ABBOTT LABORATORIES:

Neocinchophen-Abbott Tablets, 5 grains.

LOUIS HOOS:

Hoos Albumin Milk.

MALLINCKRODT CHEMICAL WORKS:

Benzyl Benzoate-M. C. W.

Antianthrax Serum-P. D. & Co.—An antianthrax serum (see New and Non-official Remedies, 1922, p. 284) marketed in syringes containing 50 c.c. Parke, Davis & Co., Detroit.

Antimeningococcic Serum-P. D. & Co.—An antimeningococcus serum (see New and Non-official Remedies, 1922, p. 286) marketed in packages of two syringes, each containing 15 c.c.; also in packages of one syringe containing 50 c.c. Parke, Davis & Co., Detroit.

Diphtheria Toxin-Antitoxin Mixture-P. D. & Co.—A diphtheria antitoxin-toxin mixture (see New and Non-official Remedies, 1922, p. 282). Each cubic centimeter represents a single human dose. It is marketed in packages of three bulbs representing one immunizing treatment; also in vials containing 20 c.c. Parke, Davis & Co., Detroit.

Tuberculin B. F. (Bovine)-P. D. & Co.—A preparation of tuberculin Denys (see New and Non-official Remedies, 1922, p. 296). It is made in the same manner as tuberculin Denys (Human), except that the bovine type of tubercle bacillus is used. It is marketed in packages of six 1 c.c. sealed glass tubes. Parke, Davis & Co., Detroit.

Borcherdt's Malt Cod Liver Oil and Phosphorus.—Each 100 c.c. contains phosphorus, 0.009 gm.; cod liver oil, 25 c.c., and malt extract (plain) (see New and Non-official Remedies, 1922, p. 176), 75 c.c. Borcherdt Malt Extract Co., Chicago. (Jour. A. M. A., July 8, 1922, p. 135.)

Yeast Preparations.—The Council on Pharmacy and Chemistry has adopted a general discussion of yeast preparations for inclusion in New and Non-official Remedies. In this article it is stated:

The use of yeast as a bactericide in external infections has been practically abandoned. Yeast and preparations derived therefrom have been widely extolled of late as sources of vitamin B whenever there may be indications for its therapeutic use. However, these indications are so indefinite and the opportunities of obtaining vitamin B through the customary foods are so abundant that the demand for yeast vitamin seems to be limited. The therapeutic aspects of the vitamin problem are still in the experimental stage. Yeast has a laxative action, but the cause of this action is not known. Yeast has been recommended for internal administration because of its supposed beneficial effects upon furuncles, acne, etc. Many clinicians doubt this effect, which may, after all, be expected from any anticonstipation agent. It is not clear to what extent, if at all, live cultures of yeast may be used to change the intestinal flora in cases where such a change is desirable. (Jour. A. M. A., July 8, 1922, p. 135.)

Epinephrine-G. W. C. Co.—A brand of epinephrine-N. N. R. It is marketed in vials containing epinephrine-G. W. C. Co. (base), 1 grain, and in the form of epinephrine chloride solution-G. W. C. Co., which contains epinephrine hydrochloride equivalent to 1 part of epinephrine in 1,000 parts of physiological solution of sodium chloride. G. W. Carnrick Co., New York.

Pituitary Extract-Lederle (Obstetrical).—An extract of the posterior lobe of the pituitary body of cattle, approximately two and one-half times the strength of solution of hypophysis, U. S. P., preserved by the addition of chlorbutanol. For actions and uses, see New and Non-official Remedies, 1922, p. 213, under Pituitary Gland. Pituitary Extract-Lederle (Obstetrical) is marketed in 0.5 c.c. and 1 c.c. ampules. Lederle Antitoxin Laboratories, New York.

Pituitary Extract-Lederle (Surgical).—An extract of the posterior lobe of the pituitary body of cattle, approximately five times the strength of solution of hypophysis, U. S. P., preserved by the addition of chlorbutanol. For actions and uses, see under Pituitary Gland, New and Non-official Remedies, 1922, p. 213. Marketed in 5 c.c. vials. Lederle Antitoxin Laboratories, New York.

Typhoid Vaccine (Prophylactic)-P. D. & Co.—A typhoid vaccine (see New and Non-official Remedies, 1922, p. 310). Marketed in packages of three ampules, containing 500 million, 1,000 million and 1,000 million killed bacteria, respectively; also in packages of three syringes, containing 500 million, 1,000 million and 1,000 million killed bacteria, respectively. Parke, Davis & Co., Detroit.

Gonococcus Vaccine-P. D. & Co.—A gonococcus vaccine (see New and Non-official Remedies, 1922, p. 301). Marketed in packages of four 1 c.c. bulbs, each containing 1,000 million killed bacteria; in packages of four 1 c.c. syringes, each containing 1,000 million killed bacteria; also in 5 c.c. and 20 c.c. bulbs containing 1,000 million killed bacteria per c.c. Parke, Davis & Co., Detroit.

Furunculosis Vaccine-P. D. & Co.—A staphylococcus vaccine (see New and Non-official Remedies, 1922, p. 306). Marketed in packages of four 1 c.c. bulbs, each containing 2,000 million killed staphylococcus aureus obtained from furuncular lesions; in four 1 c.c. syringes, each containing 2,000 million killed staphylococci; also in 5 c.c. and 20 c.c. bulbs, each containing 2,000 million killed staphylococci per c.c.

Staphylococcus Vaccine (Combined)-P. D. & Co.—A staphylococcus vaccine (see New and Non-official Remedies, 1922, p. 306). Marketed in four 1 c.c. bulbs, each containing 1,000 million killed staphylococcus albus and 1,000 million killed staphylococcus aureus; in four 1 c.c. syringes, each containing 1,000 million killed staphylococcus albus and 1,000 million killed staphylococcus aureus; also in 5 c.c. and 20 c.c. bulbs, containing 1,000 million killed staphylococcus albus and 1,000 million killed staphylococcus aureus per c.c. Parke, Davis & Co., Detroit.

Vaccine Virus-P. D. & Co.—A vaccine virus (see New and Non-official Remedies, 1922, p. 290). Marketed in packages containing one capillary tube and in packages containing five capillary tubes. Each package is accompanied by a bulb for ejecting and a needle for scarifying. Parke, Davis & Co., Detroit.

Erysipelas and Prodigiosus Toxins-P. D. & Co.—An erysipelas and prodigiosus toxin (Coly) (see New and Non-official Remedies, 1922, p. 315), marketed in packages of five 1 c.c. bulbs and in 15 c.c. bulbs. Parke, Davis & Co., Detroit. (Jour. A. M. A., July 15, 1922, p. 217.)

Albumin Milk-Hoos—Dried Protein Milk.—A modified milk preparation having a relatively high protein content and a relatively low carbohydrate content. Each 100 gm. contains, approximately, protein, 30 gm.; butterfat, 25 gm.; milk sugar, 15 gm.; ash, 4 gm., and small amounts of free lactic acid. When suitably mixed with water, albumin milk-Hoos is said to be useful for correcting intestinal disorders of infants and children. Louis Hoos, Chicago.

Neocinchophen-Abbott Tablets.—Each tablet contains five grains neocinchophen-Abbott. For a discussion of the actions and uses of neocinchophen and the description of neocinchophen-Abbott, see New and Non-official Remedies, 1922, p. 88.

Benzyl Benzoate-M. C. W.—A brand of benzyl benzoate-N. N. R. For a discussion of the actions, uses and dosage of benzyl benzoate, see New and Non-official Remedies, 1922, p. 64. (Jour. A. M. A., July 29, 1922, p. 310.)

PROPAGANDA FOR REFORM

"Medical" Testimonials for Chiropractic.—Chiropractors affect, with "patent medicine" fakery, a fine disdain for scientific medicine and the medical practitioner. How readily, however, do both seize with avidity any statement made by an individual who may be presumed to have the right to put "M.D." after his name—provided that statement seems favorable to the cause or may be so twisted as to make the public believe that a reputable physician has spoken a good word either for chiropractic or nostrum industry.

For some time there has been going the rounds a chiropractic advertisement purporting to quote "Opinions of Well-Known Medical Men" on chiropractic. The material obviously emanates from one of the chiropractic "ad" factories. These make a business of supplying the individual chiropractor with advertising copy that he, because of his educational deficiencies, would be unable to write for himself. According to these stock advertisements: ". . . there is an ever-increasing number of M.D.'s all over the United States and Canada who understand, appreciate and practice straight chiropractic to the exclusion of medicine and every other method, as witness the following selected at random." Then follow what purport to be quotations from physicians. An examination of the records of the individuals who are quoted permits an appraisal of their testimonials. (Jour. A. M. A., July 1, 1922, p. 57.)

Digalen.—Digalen was introduced with the claim that it was soluble amorphous digitoxin (a substance unknown to chemists) and with the claim that it possesses all the advantages and none of the disadvantages of digitoxin, such as cumulative effect and the production of nausea (claims which have been made for many proprietary digitalis preparations, but which always prove untenable). In 1909, the Council on Pharmacy and Chemistry admitted Digalen to New and Non-official Remedies after the manufacturer had discontinued the palpably unwarranted claims which had been made for the preparation. The Council did not determine whether Digalen contained "soluble amorphous digi-

toxin," but accepted it merely as a standardized and fairly stable digitalis preparation. Subsequently, the claim that it was a stable preparation was challenged. In view of the increased extravagance of the claims for Digalen, the Council in 1915 made a re-examination of this product and directed its omission from New and Non-official Remedies. There is no available evidence to indicate that Digalen has any advantage over tincture of digitalis or the infusion of digitalis for oral administration or that it is equal to ouabain or strophanthin for intramuscular or intravenous injection. With a better knowledge of proper dosage—for instance by Eggleston—an increasing number of practitioners find that, except in exceptional cases, the desired action of digitalis can be obtained by the administration of the official tincture of digitalis. (Jour. A. M. A., July 1, 1922, p. 61.)

Densitization to Rhus.—Contrary to the theory of "densitization" to rhus poisoning by internal administration of tincture of rhus, it appears that the susceptibility to rhus may be increased by successive intoxications. (Jour. A. M. A., July 15, 1922, p. 220.)

More Misbranded Nostrums.—The following products have been the subject of prosecution by the federal authorities charged with the enforcement of the Food and Drugs Act:

Hooker's Cough and Croup Syrup (C. B. Kingsley), containing oil of anise, oil of wintergreen, alcohol, sugar, water, blood-root and a balsam, probably tolu.

Madam LeRoy's Regulative Pills (Le Roy Chemical Co.), containing aloes and traces of pennyroyal and tansy.

Naphtholene (Dr. E. E. Sonnanstine), containing gasoline, kerosene and a small quantity of resin and red pepper.

Homosan (International Toilet Co.), consisting of tablets containing a trace of strychnin.

Haskin's Cough Medicine (Haskin Medicine Co.), a liquid carrying tar, chloroform, sugar and water.

McMullin's Tonic (Tilden McMullin Co.), containing alcohol, glycerin, iodids, phenol (carbolic acid), and water.

Dupree's French Specific Pills (United Drug Exchange), containing aloes, iron sulphate and a trace of alkaloids, with indications of cottonroot bark and tansy.

Apollo Brand Sexual Pills (S. Pfeiffer Mfg. Co.), containing extract of nux vomica and damiana and phosphorus.

Giepsi Vemela (Giepsi-Vemela Co.), consisting of vegetable extractives, sugar and water.

Montauk Star Brand Pills, containing iron sulphate, aloes, and a trace of strychnin.

Princess Brand Pennyroyal, Tansy and Cotton Root Bark Compound Pills, containing aloes.

Shores Lung Balsam (Shores-Mueller Co.), containing pine tar, ammonium chlorid, a salicylate, chloroform, glycerin, sugar and water.

Shores Mountain Oil Liniment (Shores-Mueller Co.), containing cajeput, wintergreen, sassafras, cedar oils, camphor, ammonia, borax, washing soda, plant extractives, capsicum oleoresin, alcohol and water.

Shores Sarsaparilla (Shores-Mueller Co.), containing extracts of plant drugs, including a laxative, a salicylate, a small amount of ammonium chlorid, a trace of alcohol, glycerin and water. (Jour. A. M. A., July 15, 1922, p. 232.)

Haelepron Tablets Not Admitted to N. N. R.—Haelepron Tablets are made by Bodenstein and Gaslinsky, Berlin,

Germany, and sold in the United States by the Haelepron Sales Co., New York. The following, nonquantitative statement of the composition of Haelepron Tablets appears on the trade package: "Haemaglobin, Lecithin, Calc, Lact., Protein vegetab., Ferr. Sacch., Ferr. pyrophos." The Council on Pharmacy and Chemistry finds Haelepron Tablets inadmissible to New and Non-official Remedies because (1) their composition is definite and semisecret; (2) the recommendations for their indiscriminate use are unwarranted; (3) the name is not descriptive of their composition, and (4) they are an irrational and useless combination which can have little, if any, effect on the conditions for which they are recommended. (Jour. A. M. A., July 22, 1922, p. 319.)

Platt's Chlorides.—An advertisement for Platt's Chlorides calls attention to the fact that chlorin antiseptics are at present in favor. The statement is then made that "chlorid of lime" is perhaps the best known of the older chlorin antiseptics. In the advertising it is stated, more or less directly, that Platt's Chlorides contains "chlorid of lime." Chlorid of lime is an unscientific name for chlorinated lime, official in the U. S. Pharmacopeia as Calx chlorinata. An analysis of Platt's Chlorides, made in the A. M. A. Chemical Laboratory several years ago, failed to show that the preparation contained any active chlorin upon which the virtues of chlorinated lime depend. Chlorides were present, but chlorides are not known to have any germicidal effect. A re-examination of Platt's Chlorides, made recently in the Association's Chemical Laboratory, again demonstrated the absence of active chlorin such as is contained in chlorinated lime. (Jour. A. M. A., July 22, 1922, p. 319.)

PROGRESS

Abstracts to be submitted to Section Supervisors.

MEDICINE

SUPERVISORS:

F. J. HIRSCHBOECK,
FIDELITY BLDG., DULUTH
THOMAS A. PEPPARD,
LA SALLE BLDG., MINNEAPOLIS

THE VALUE OF QUINIDINE IN ARICULAR FIBRILLATION AND THE METHOD OF STUDYING THE CLINICAL REACTIONS—Thomas Lewis (Am. Jour. Med. Sc., June, 1922): Lewis is giving a series of lectures at the University of Oregon Medical School in Portland, and this abstract is made from the first lecture of the three.

A review is given of the historical aspects relating to the clinical action of quinidine in auricular fibrillation. He believes its original discovery as a remedy for auricular fibrillation is purely accidental, and due to clinical methods of observation.

The effects of auricular fibrillation are briefly these: It paralyzes the action of the auricles, it wholly abolishes the regularity of the natural pulse, two effects, each of which handicaps the circulation in some measure. Third, it raises the rate of the beating ventricle.

Auricular fibrillation throws a greatly increased burden upon the already weak heart, particularly during the uncontrolled state of the heart in exercise. Fibrillation of

the auricles so upsets the balance between the call to work and the power to work that it has been regarded rightly as a most serious cardio-vascular malady. It is upon this condition that quinidine exerts its beneficial influence, destroying the abnormal rhythm. The drug is of use in bringing out a normal rhythm in about 50 per cent of the cases.

Lewis studied various methods of dosage, using large single doses, and repeated average and small doses. He noted that the administration of the drug in large doses caused a prompt reduction in the auricular rate to about 300 or less. The ventricular rate, after the administration of the drug, rises rather rapidly, on the other hand, and may be 140 or even 160 per minute. Recovery from the action of the drug is due to the elimination. Repeated dosage tends to make this auricular retardation and ventricular acceleration more persistent. Lewis believes that the administration of digitalis at the same time is of advantage, for it keeps the ventricular rate at a comparatively low level throughout the quinidine reaction, thereby removing one source of the trouble. He advises a course of digitalis immediately before using quinidine, or a lighter course simultaneous with it. Heavier doses of quinidine, however, may be necessary.

Toxic effects from the administration of quinidine have been noted, such as giddiness, fullness in the head, headache, gripping in the abdomen, or loose evacuations. Palpitation, due to the ventricular rise, need not be of particular concern unless it rises over 100 and the auricular rate falls below 250. In cases of this kind, and generally with high ventricular rate, digitalis should be used in addition. Multiple extra systoles, if oft repeated, should be a signal for discontinuance of the quinidine. Some patients have an idiosyncrasy. A small initial dose should be attempted, followed in twenty-four hours by a little larger dose, then beginning the treatment on the subsequent day.

The dangers of embolism apparently are rather frequent, but not in the experience of Lewis. However, in marked decompensation from the circulatory standpoint, quinidine should not be employed, for the peril of embolism is unquestioned and is too great.

Approximately 50 per cent of fibrillating auricles are only restored to the normal rhythm by its use. Patients with auricular fibrillation, in whom the normal rhythm is restored, feel real benefit, as exercise has no longer such a marked influence in causing discomfort. The drug should not be used in cases of venous stasis. In some patients the restored normal rhythm lasts only a few days or a week, and the fibrillation returns again and again after successive periods of treatment. Others have been benefited for a year or more. In the latter group it must be judged an unqualified success.

F. J. HIRSCHBOECK.

PHYSICAL EXERCISE IN HEART DISEASE. Theodore B. Barringer, Jr. (*Jour. Am. Med. Soc.*, July, 1921), calls attention to the value of blood pressure readings before and after exercise in determining accurately the amount of exercise which should be allowed a heart case.

One of the lessons of war service was the value of exercise to normal hearts and in the so-called neuro-circulatory asthenia cases. From our knowledge of physiology we know that exercise increases heart output, blood pressure

and the blood supply to skeletal and heart muscle. The increase in blood pressure is accomplished partly through splanchnic constriction and also by stimulation of the vaso-motor center. There is a corresponding dilatation of the vessels in the skeletal and heart muscle accompanying exercise. He decries the usual advice given heart cases not to exercise and believes from his experience that exercise is of value to the diseased heart as well as to the normal heart in increasing its reserve strength.

He has shown that normally blood pressure rises during exercise and that the height attained is maintained for some 60 seconds following the cessation of the exercise and that the pressure gradually returns to the pre-exercise level. In experiments on hearts with valvular and myocardial changes and with little or no reserve he has found that less exercise is required to produce a greater rise in pressure than in the normal case, which is usually 20 to 40 mm. Hg.; that the pressure continues to increase after the exercise has ceased and that a more gradual return to the pre-exercise level results in these abnormal heart cases.

The much used test of hopping 100 times and comparing the pulse a few minutes later to the pre-exercise rate he believes to be of value only to advanced heart cases. He believes the findings of a delayed rise and prolonged fall in blood pressure to indicate an overtaxed heart and uses the test in determining the nature and amount of exercise suitable to a given case.

Two types of exercises are used. The mild include walking, arm and leg exercises and dancing (limited to the one-step). The energetic exercises include the use of dumbbells (one to fifteen pounds), stair climbing, skipping rope, running in place, hopping and waist exercises. A certain number of units of exercise, called a "close," are used for from five to twenty minutes to be followed by a rest period until pulse and respiration are normal. This is repeated five to ten times during the exercise period. It is difficult to translate one type of exercise into terms of another, but it may be stated that a patient who can swing a five-pound dumbbell from the floor over his head ten times in twenty seconds without showing the abnormal blood pressure findings, indicating an excess, can slowly climb a ten foot rise in stair or walk easily on a level. Likewise if he can swing a ten pound bell ten times he can walk a half hour up a slight grade or play nine holes of golf on a not too hilly course.

The value of weight reduction in the treatment of heart cases he believes to be great and has found no weakening effect as so often mentioned from rather rapid reduction.

C. B. DRAKE.

THE GENERAL SYMPTOMATOLOGY AND DIFFERENTIAL DIAGNOSIS OF DISSEMINATED SCLEROSIS—B. Sachs (*Arch. of Neurology and Psychiatry*, May, 1922): A revision of our concept concerning multiple sclerosis is necessary and the diagnosis more broadly applied. Some observers of a decade or two ago considered the condition rare; others, nearly as frequent as tabes, depending upon the interpretation of symptoms and the adherence to the diagnostic restrictions emphasized by the French, as represented by the classical triad: nystagmus, intention tremor, and scanning speech. This latter opinion

must be disregarded if multiple sclerosis is to be diagnosed in its early stages.

Sachs' studies are based on a series of 141 cases, 91 of which were from the Mount Sinai Hospital, which is considered essentially an "acute" service. The incidence of multiple sclerosis in the neurologic service was 3.9 per cent; of syphilitic affections of the central nervous system, 23.8 per cent. It was found that multiple sclerosis was more than half as common as tabes dorsalis, and fully as frequent as general paresis, particularly since multiple sclerosis in its early stages does not require hospital treatment.

At the Montefiore Hospital the incidence of disseminated sclerosis and tabes is as 5 to 8.5, with a much greater frequency than general paresis, the latter being only 1.7.

Sachs mentions the following signs and symptoms of multiple sclerosis in the order of their diagnostic importance, based on his study of these cases, and found the most common to be:

Increased and deep reflexes.....	90%
Fatigue, weakness and stiffness of one or both upper or lower extremities, terminating in spastic para- plegia	81%
Diminution or loss of abdominal reflex.....	83%
Positive Babinski	78%
Nystagmus	70%
Ataxic tremor of the upper extremities and tremor of the head	55%
Spastic ataxia or ataxic gait.....	43%
Remissions, leading to disappearance of symptoms...	42%
Disturbance in vesical reflex.....	40%
Scanning speech or some form of dysarthria.....	36%

In the differential diagnosis, multiple cerebrospinal syphilis is especially to be considered, as the symptoms may closely resemble each other. Remissions and exacerbations are common. Slight beginnings may develop into marked spastic weakness and increase of the deep reflexes.

The positive biologic findings, increase in the globulin, pleocytosis in the spinal fluid, pupillary phenomena, ocular palsy, point indubitably to the constitutional infection. On the other hand, in multiple sclerosis we have the symptoms as enumerated above as being particularly common, those, one might say, distinctive being especially nystagmus, transitory ocular pareses, intention tremor, and spastic contractions. Excessive spasticity would point toward syphilis rather than multiple sclerosis.

F. J. HIRSCHBOECK.

POSTOPERATIVE PULMONARY COMPLICATIONS

—Cutler and Hunt (Arch. of Int. Med., April, 1922): The authors will be remembered for their exhaustive, well written paper in the Archives of Surgery, 1920.

The records in the hospitals should be more carefully kept in relation to the development of pulmonary complications postoperatively. A review of the records as kept at present in most hospitals will show a grave laxity in statistical data, which would be helpful in estimating the frequency of postoperative pulmonary complications.

The morbidity in the 1,604 cases considered in 1920 by Cutler and Hunt was 3.92 per cent. Previous records were considerably lower than this, but the maintenance of better hospital records is probably the reason for the increasing

morbidity figures, particularly since the mortality percentage is reduced. The mortality percentage of the morbidity in the series studied was 7.9 per cent. The patients with terminal pneumonia, bulbar palsy, or fatal primary lesions, were not considered.

The authors believe that embolism from the operative field is the most frequent cause of pulmonary complications, and that aspiration plays only a very secondary part. Anesthetists and anesthesia are too frequently blamed for postoperative pulmonary complications, and Cutler and Hunt have taken up the cudgel for them, since they seem to refuse to do it themselves.

It is true that irritation and aspiration from inhalation anesthesia may cause a small percentage of postoperative pulmonary complications, but almost invariably there is a pre-existing pulmonary lesion, such as chronic bronchitis, incipient tuberculosis, or acute respiratory infections. Pulmonary complications occur as frequently with local anesthesia as with inhalation anesthesia. The authors do not believe that chilling or acidosis play any appreciable rôle in the development of complications in the lungs.

A reduction in the number of cases that result in these complications may be had by: (1) A reduction in trauma at operation; (2) accurate hemostasis; (3) the careful control of sepsis; (4) the use of great caution in operating upon patients with demonstrable pulmonary disease. A high fluid intake as a general precaution in giving assistance to the circulatory apparatus will be of definite value once such complications are established.

F. J. HIRSCHBOECK.

CERVICAL RIB, WITH REPORT OF TWO CASES—P. C. Colonna (Amer. Jour. Med. Sc., January, 1922): Detection of cervical rib dates back to the time when the roentgen ray came into use. Rudimentary lumbar ribs are more frequent. They are of little practical importance. A series of one thousand post-mortems has shown that 1 per cent of the cases presented rudimentary ribs. From 60 per cent to 70 per cent of the cases occur in females. According to Beck 67 per cent are double. Of the cervical ribs, the seventh is the most commonly found. Origin is no doubt congenital; symptoms are present seldom before second decade of life. Size has no relation to symptoms. Symptoms are divided into four classes:

- (a) Bulging mass in lateral cervical region.
- (b) Pressure signs, neurologic or circulatory in character.
- (c) Pulsation of subclavian artery.
- (d) Cervical scoliosis.

Adventitious ligaments sometimes give similar signs. The brachial plexus and subclavian artery pass over the cervical rib and pressure symptoms referable to nerve and vascular structures follow. Neuralgic pain in neck, head, thorax, arm and hand, parasthesia in hand, inability to extend arm at elbow and hoarseness due to involvement of the recurrent laryngeal nerve constitute a typical clinical picture. The anomalous rib elevates the subclavian artery and the pulsation appears. Aneurisms are rare. Scoliosis present in 16 per cent of cases. Its mere co-existence is possible.

Treatment: If symptoms are acute, patient should be given rest in bed for two weeks. Surgery is always indicated unless there is an aneurism. The posterior cervical

route is preferable. The periosteum should always be removed unless an aneurism is found.

The author reports two cases, both making a good recovery.

J. C. MICHAEL.

THE COLLOIDAL GOLD-CHLORIDE CURVE IN EPIDEMIC ENCEPHALITIS—Catherine M. Howell (Arch. of Neurology and Psychiatry, February, 1922): Examinations were made of 38 cerebrospinal fluids from patients with epidemic encephalitis or convalescing therefrom. They were examined from six days to seven months after the onset of the symptoms. Seven fluids of 38 gave no color change in the colloidal gold-chloride solution, although 5 of the 7 gave positive globulin reactions. The cell count ranged from 2 to 212, with the mononuclear percentage varying from 60 to 100 per cent. Fourteen of the spinal fluids changed the colloidal gold-chloride solution to red-blue in the lower solutions, which frequently occurs with normal spinal fluid, and never extended above the sixth tube. This group also showed a great variation in the cell count from 2 to 220, with a mononuclear percentage of 40 to 100. The globulins were negative in 3 of the 14 fluids, and the Wassermann, of course, negative in all. Seventeen of the spinal fluids gave a colloidal gold-chloride curve above red-blue in the lower solutions. These fluids were all taken from 3 days to 4 weeks after the onset of the symptoms. The globulins were positive in all of this last group; the cell count varied from 7 to 400. Three of these cases gave typical parietic curves with the gold-chloride solution, although in one patient a week later the typical parietic curve was lost.

It is Howell's belief that there is no characteristic colloidal gold-chloride curve obtained in epidemic encephalitis, but that when a color change does occur it occurs in the lower spinal fluid dilutions, in the so-called "syphilitic zone." The colloidal gold curve does not bear any relationship to the cell count, the percentage of mononuclear cells, nor the globulin content.

F. J. HIRSCHBOECK.

THE MENTAL SYMPTOMS OF MULTIPLE SCLEROSIS—Sanger Brown and Thomas Davis (Arch. of Neurology and Psychiatry, May, 1922): There is no consistent group of mental symptoms occurring in multiple sclerosis. Including euphoria, probably in 90 per cent of the cases we find mental alterations which warrant the term "symptom." The relative infrequency of multiple sclerosis in insane patients is probably due to the fact that the physical condition makes the patient inapt in his physical undertakings, and renders him non-potential from the psychiatric standpoint. Brown and Davis believe that euphoria is very common, and the patients rarely think of their condition as serious nor do they seem deeply concerned. Patients with mental depression and suicidal ideas are occasionally seen. Mental deterioration, as the condition progresses, becomes more common. Auditory hallucinations are not uncommon. Even though there is marked deterioration in multiple sclerosis, the patients do not, as a rule, show much change in their personality, and grave disturbances are rare. Secondary symptoms, such as marked depression and paranoid conditions, depend probably to a great extent on

the mental makeup of the individual before the disease develops, but this is not true of the primary mental symptoms, such as euphoria, hallucinations and the confused states.

F. J. HIRSCHBOECK.

FEBRILE STAGES IN CHRONIC NEPHRITIS—J. Oscar Ritchie (Amer. Jour. of Med. Sc., June, 1922): The author calls to mind the observation previously made by many contributors that infection probably plays a part in the etiology of nephritis. Ritchie believes, as a result of his observations, that during the febrile elevations, either due to infection or some other agents, there is a noticeable depression in renal function.

It is not uncommon for cases of chronic nephritis to manifest temperature deviations of this kind, and, as Emerson has previously observed, patients with chronic nephritis and with occasional exacerbations of fever and increased albuminuria, have an added acute process superimposed on the chronic condition.

Other observers have noted that even though kidney function is not materially depressed consistently in acute infectious fever, it is indubitably so in febrile reactions accompanying chronic nephritis. Renal functional tests and the chemical studies of the blood show that during the periods of fever there is a simultaneous functional impairment.

F. J. HIRSCHBOECK.

THE INFLUENCE OF RIGID SALT RESTRICTION IN THE DIET OF CHRONIC NEPHRITIS—Dr. James McLester: McLester has repeated some of the work of Dr. F. M. Allen on salt restriction in patients with chronic nephritis and essential hypertension. His conclusions are not encouraging, as he believes that the patients find the food extremely unappetizing and that weight reduction is marked. The blood urea showed a tendency to increase, and the blood chloride varied but little, although the urine chloride fell to a very low figure. The systolic pressure was little, if at all, affected.

He believes, therefore, that salt-free diets accomplish little, if anything more, in hypertension, than a salt-poor diet as ordinarily prescribed.

F. J. HIRSCHBOECK.

SURGERY

SUPERVISORS:

E. MENDELSSOHN JONES,
LOWRY BLDG., ST. PAUL
VERNE C. HUNT,
MAYO CLINIC, ROCHESTER

TREATMENT OF MULTIPLE PAPILLOMAS OF THE LARYNX IN CHILDREN*—G. B. New (Ann. Otolaryng. and Rhin. and Laryng.): The treatment of multiple papillomas of the larynx in children has always been difficult because of the tendency to recurrence. Many methods have been employed, such as tracheotomy, thyrotomy and cauterization.

*Abstract of paper presented before the Southern Minnesota Medical Association, Winona, June, 1921.

doscopy operative measures, fulguration, the application of various medicines locally, and x-ray and radium. During the past six years the author has employed radium both inside the larynx and outside the neck, with more satisfactory results than by any other method.

Mackenzie, Clark and Smith stated that they believe tracheotomy to be the most efficient method of treating papillomas of the larynx. While the value of tracheotomy is well known, cases are reported in which the patients have worn tubes for years without improvement. Polyak advocates the use of radium as a substitute for operative measures. Abbe, in 1898, was the first in this country to treat multiple papillomas of the larynx with radium. Several observers have reported poor results with radium, but on the whole the method seems quite satisfactory. Lynch's suspension apparatus has added a great deal to the efficient care of these patients. His results in removing multiple papillomas by operative measures have been superior to any others on record in this country. He now believes, however, that the best method of treatment is by fulguration or with acid nitrate of mercury.

From the year 1914 to 1920 the author has examined at the Mayo Clinic twenty-six children, between the ages of ten and twelve, who had multiple papillomas of the larynx. Such patients were usually brought to the clinic because of hoarseness or shortness of breath, which began at the age of two or three months as a slight wheezing or crowing cough. Sometimes symptoms do not appear until the child is three or four years old.

Multiple papillomas of the larynx are often diagnosed as laryngismus striculus, asthma, and enlarged thymus, but these conditions can be ruled out by a careful history. The diagnosis can be made only by laryngoscopic examination.

Many of the patients in this series had been operated on by endoscopic methods. One patient had had six thyrotomies and cauteries, which resulted in a marked scarring of the glottis and the necessity of wearing a tracheotomy tube. One patient had had six suspensions and removal of papillomas, but on examination at the clinic the larynx was filled with a papillomatous growth. Nineteen of the patients had tracheotomies previously or shortly after their arrival at the clinic. Tracheotomy was not performed unless obstruction made it necessary.

The treatment in this series of cases was given under ether by means of the Lynch suspension apparatus. Except in a few of the early cases no attempt was made to remove the papillomas. A small tube containing radium salt or emanation was inserted into the glottis and kept moving under direct observation. From 75 mg. to 150 mg. or millicuries of radium were used for from twenty to thirty-five minutes. No screening was used except the silver tube of the container, which was 1 mm. thick. Treatments were given once in six weeks or two months. Patients must be seen at definite intervals. The most suspensions given in one case were six and the least one. In addition to this radium was applied outside the larynx; about 3,000 mg. hours were given, using one inch of wood and 2 mm. of lead screening.

Nine of the twenty-six cases can not be considered in the results, as some patients were not treated at all and

others received only one treatment because they could not return at definite intervals.

Of the seventeen patients concerning whom definite information was obtained, eleven are entirely free from papillomas; nine of these had had tracheotomies and the tube had been removed. The tube is always left in place at least six months after the larynx is free from papillomas. One patient suffered a collapse of the trachea above the opening but a two-way tube was inserted for a while and later removed. Two of the eleven patients did not have tracheotomies or treatment by suspension, because of frequent colds, but received external applications of radium. Six of the seventeen patients are still under treatment, five of these during the last year only. Four of the six patients are almost entirely free of papillomas, and the voice is fairly good. Three of these four can cork their tracheotomy tubes. In the entire group the author has not seen any bad results following the use of radium, and he believes this is undoubtedly due to the fact that the radium was under direct observation and was kept moving while in the glottis.

FRENCH K. HANSEL.

DIAPHRAGMATIC HERNIA—D. L. Borden (Ann. of Surg., 1922, 75. 337-343): Increased numbers of diaphragmatic hernias have of late been observed, due in part to the types of wounds received in the world war and in part to increased roentgen ray efficiency in demonstrating the condition preoperatively. Previous to 1914, 650 cases had been reported by Griffin, and since then several cases have been reported by various other observers. The anatomical points of diaphragmatic weakness allowing hernial entrance occur at the esophageal opening, and at the juncture between the ensiform and costal cartilages, as well as the space posteriorly between the psoas muscle and the ribs, where muscular tissue is absent. Congenital defects of the dome of the diaphragm may occur, but most commonly there is an absence of muscular tissue about the esophageal foramen.

Acquired hernia may be incited by either increased intra-abdominal pressure or by direct injury and the organ most frequently seen in the diaphragmatic hernia is the stomach. The transverse colon, omentum, small intestine, spleen, liver, pancreas and kidney are noted in the order of their herniated frequency.

The symptomatology varies with the size of the diaphragmatic deficiency and the organ involved in the hernia, but generally pain is noted in the chest and epigastrium immediately after eating. Sudden attacks of dyspnea without apparent cause and emesis without premonitory signs may also be observed. Combined with the visceral displacement must be considered the not infrequent occurrence of such complications as adhesions, constrictions, obstructions, and inflammation of the hernia.

The treatment of diaphragmatic hernia is surgical and the abdominal route of approach is the one of choice. With adhesions preventing hernia reductions from below, an additional thoracotomy may be resorted to in order to mobilize the hernia. With a traumatic opening in the chest wall, one may be able to reduce the hernia from above and repair without celiotomy. Either a long left rectus or an S incision, as used by Bevan, may be advantageously employed in the abdominal route.

Repair of the diaphragmatic hernial opening may be made by the approximation of the pillars of the opening, or, if the diaphragm be lax enough, by overlapping and suturing the free edges. In some instances, obliteration of the defect may be accomplished by suture of the diaphragm to the chest wall. When the defect is too large to close by suturing, the stomach, omentum and mesentery may be so attached to the diaphragm as effectually to close the defect.

A case is reported in which symptoms of six years' duration were present. At operation a large hernia of the large and small bowel was found, which passed through a deficiency in the dome of the left side of the diaphragm three inches in diameter. Reduction of the hernia was followed by a fairly uneventful convalescence, and roentgen ray examination with barium enema three months after operation showed the colon to be entirely within the abdominal cavity.

C. H. JACKSON, JR.

ACUTE HEMATOGENOUS OSTEOMYELITIS—C. L. Starr (Arch. of Surg., May, 1922, pp. 567-587): Starr asserts that the condition which we call osteomyelitis is essentially an inflammation of all structures of the bone and really should be designated a periosteomyelitis. He believes it is practically always a blood-borne infection from a primary focus situated elsewhere in the body. This primary focus may be the tonsils or mouth cavity, but is much more frequently some local infection of the skin as boils or infected wounds or cellulitis. The most common organisms are staphylococcus aureus and some strains of the streptococci. An injury may frequently be the determining factor in localizing the site of invasion.

In his experience, the initial focus of infection is usually located in the juxta-epiphyseal region of a long bone and spreads fairly rapidly along the line of the epiphysis to reach the periosteum. Frank pus is here formed and the infection spreads rapidly under the periosteum, stripping this structure from the bone surface. It spreads less rapidly through the cancellous bone to the medullary canal, and the medullary canal is more frequently invaded through the haversian canals, secondarily to the periosteal infection.

Roentgen-ray findings are always negative in the early stages and remain so until gross destruction of bone has taken place or until involucrum develops. Diagnosis must be made on the signs present. Severe pain in the region of a joint, with a spot of extreme tenderness, in a growing child is extremely significant. If it is accompanied by high fever and rapid pulse with high blood count, the diagnosis is moderately certain. Swelling, redness and edema are later signs. The author cites illustrative cases.

DONALD K. BACON.

BLIND END CIRCULAR SUTURE OF THE INTESTINE, CLOSED ENDS ABUTTED AND THE DOUBLE DIAPHRAGM PUNCTURED WITH A KNIFE INTRODUCED PER RECTUM—W. H. Halsted (Ann. of Surg., 35:64, March, 1922): Halsted reports on an experimentally developed method of enteroanastomosis in which superior asepsis can be maintained. This operation has been performed on dogs but not on humans to date.

The procedure is as follows: The mesenteric blood ves-

sels of the gut to be resected are divided between ligatures and mobilization completed. The intestine is next clamped and tied about with a ligature adjacent to the points where it is to be divided. Purse-string sutures are placed about the ends to be united. The gut is then divided, preferably with the cautery, and the two stumps inverted as in appendectomy. The blind ends are approximated and an axial union made, using two rows of stitches. A knife encased in flexible metal gas tubing with a small cork protecting the point is then introduced per rectum by an assistant. This is a spear pointed knife, sharpened on both sides. The knife is maneuvered by the operator to the site of anastomosis, the metal tube allowed to drop back and the cork removed. The double diaphragm of intestine is then punctured by stellate incisions. The knife is then reinserted into the tubing and removed per rectum.

Halsted reports uniformly good results with this operation. He has seen no ill results from the necessarily large circular flaps on the interior of the bowel at the point of union and no cases of obstruction have occurred. He believes that more nearly perfect asepsis is present than is usually the case and that no more soiling should occur than during appendectomy. This method is of value only in the large bowel.

DONALD K. BACON.

GASTRIC HEMORRHAGE—G. E. Armstrong (Surg., Gyn. and Ob., 1922, 34, 466): Armstrong presents a study of a group of patients having gastric hemorrhage for which no satisfactory explanation has been advanced by the surgeon, the pathologist, the bacteriologist, or the physiologist. In these patients bleeding is of sudden onset and tends to recur at short intervals without apparent cause.

The author cites the case of a civil engineer, thirty-three years of age, who, after a simple breakfast, was seized with epigastric pain followed by brisk hemorrhage. Morphine and ice were used without relief as he immediately had another hemorrhage. Gastroenterostomy was performed and fluids were forced. The patient died twenty-four hours after operation immediately following a third hemorrhage.

Necropsy was negative. There had been no evidence of leukemia or hemophilia. Several cases of this type have been reported. Although surgery is useless, transfusion is of some help.

Transfusion, its origin and history are discussed. Efforts were early made to replace lost blood at any cost, and blood of animals was frequently employed. Then came the period when other liquids, such as salt solution, were used. Crile and others showed, as a result of work done during the war, that human blood was the ideal fluid, its efficiency doubtless being due to contained colloids.

The cases of gastric hemorrhage under consideration in this paper may be due to a microorganism. Armstrong looks for the day when some one following Rosenow's lead will discover an organism to which the cause of this unusual hemorrhage can be attributed.

S. F. ADAMS.

A FURTHER REPORT ON TRAUMATIC FAT NECROSIS OF THE FEMALE BREAST AND ITS DIFFERENTIATION FROM CARCINOMA—B. J. Lee and F. E. Adair (Surg., Gyn. and Ob., April, 1922, 521-31):

Lee and Adair report three additional cases of traumatic fat necrosis of the breast. These cases show hard definite tumors, which require careful study to exclude carcinoma. The microscopic picture shows a chronic productive inflammation surrounding a mass of necrotic and saponified fat with perhaps a few giant cells about the periphery. Any gland tissue present may be the site of inflammatory changes with round cell infiltration about the ducts.

Clinically these cases have occurred with 1.8 per cent of the frequency of primary breast carcinoma and are found during the same age period. In all instances the patients have been corpulent with large, full breasts. A bona fide accurate history of trauma, which is very definite, has been elicited in each case. The tumors are invariably hard and frequently show skin fixation. Inconstant and variable signs are: Ecchymosis following trauma, pain, nipple retraction and deep attachment. In no case were hard, tender or markedly enlarged axillary or supraclavicular glands found.

The time from the receipt of trauma to the recognition of tumor varied from 3 weeks to 10 years.

DONALD K. BACON.

THE DIAGNOSIS AND TREATMENT OF SOME COMMON INJURIES OF THE SHOULDER JOINT—R. W. Lovett (Surg., Gyn. and Obst., April, 1922, pp. 437-444): Lovett reviews the principal points of shoulder joint anatomy and decries the frequency with which the stock diagnosis of subacromial bursitis is made in all obscure conditions of the shoulder. The term neuritis, unless proved, he considers scarcely less objectionable.

For sprain, which in a later stage becomes a peri-arthritis, or for muscle strain, fixation in an abduction splint is advised to take the weight from the capsule and supporting muscles and relieve pain. This procedure may also be of value in bursitis or rupture of the supraspinatus insertion. These latter conditions may require operative interference with removal of a diseased bursa or fixation with a pin of the bone fragment, which is sometimes detached from the humerus by the action of the supraspinatus at its point of insertion.

DONALD K. BACON.

PEDIATRICS

SUPERVISORS:

FREDERICK C. RODDA,

CHILDREN'S CLINIC, MINNEAPOLIS

ROY N. ANDREWS,

MANKATO CLINIC, MANKATO

MEDICATION IN INFANCY AND CHILDHOOD—

James D. Love (Arch. of Ped., April, 1922): During the past two decades, the pediatrician has greatly neglected the science of pharmaco-therapy. A visit to the pediatric clinic of any of our most reputable institutions will convince any one that our teaching hospitals at present are

more diagnostic institutes than institutes of therapy. It is not remarkable that the average student of medicine becomes imbued with the mistaken dictum that diagnosis is the one essential and anyone can treat a disease once a diagnosis has been made. With new and valuable drugs at our command and older drugs better standardized than ever before, with striking advances in our knowledge of applied physiology and rational therapy, medication should be a more definite and exact art than at any time in the history of medicine. Many of us take as things for granted the good effects of drug medication and allow our disappointments to render us skeptical, if not indeed nihilistic. Children lend themselves more readily to drug medication than do adults, since, for the most part, but one organ is markedly involved and a qualitative diagnosis is not so essential, and since most often the disturbances of children are functional rather than organic. Pediatricians, then, more than the followers of any other branch of medicine, should become both apostles and teachers of pharmaco-therapy. If a feeding case can be made more comfortable and the duration of the illness shortened by the temporary employment of laxatives and stomachic tonics, by drugs that mitigate suffering, by sedatives that furnish a needed rest and restore the lost balance, we see no reason for their being withheld. The abuse of drugs is by no means confined to the pediatrician, nor is it in any way sectional. The greatest death toll exacted of children for the abuse of drugs is in connection with the use of opium in the management of infectious diarrheas, and when physicians in general realize this, then opium will be assigned a position in the list of useful drugs to which it is entitled.

In the writer's opinion, one of the most pernicious practices now in vogue is the very frequent administration of glandular substances for the many diverse and obscure disorders of sick children. These criticisms apply equally to the employment of mixed vaccines for almost every affection incident to childhood. Unless positively indicated, the good results following the use of vaccines are not commensurate with the pain inflicted on the little sufferer, nor does their use compensate for the dread and horror of the doctor thus invariably inspired.

It is only through close co-operation between our research laboratories and the clinical and teaching departments of our hospitals, through reliable information concerning the potency, physiological action and indication for drugs, based on laboratory experimentation and observation in hospitals by unprejudiced clinicians, that the art of pharmaco-therapy will be advanced.

R. N. ANDREWS.

THE EFFECT OF ARTIFICIAL SUNLIGHT ON METABOLISM—W. Lasch and E. Wortheimer (Monatschr. f. Kinderh., November, 1921): The authors show greatly increased calcium and phosphorus retention in three cases of rickets treated by radiation with the quartz lamp. The extraordinary rapidity of the effect strengthens the belief that disturbance of metabolism and not the bony changes is the important thing in rickets. The cause of this retention of calcium is unknown. The authors suggest the possibility of:

1. Changed colloidal condition of the blood.

2. Stimulation of the skin to production of hormones.
3. Action of ferments promoted.

E. F. ROBB.

RELATIONSHIP BETWEEN PEMPHIGUS NEONATORUM AND IMPETIGO CONTAGIOSA—Bruno Feilchenfeld (Berl. Klin. Wchnchr., Dec. 5, 1921, 58: 1436): The writer reports two cases indicating the identity of these diseases:

First, a case of pemphigus neonatorum followed a few days later by pemphigus vesicles and impetigo crusts in a three-year-old sister, and this in turn followed by typical impetigo contagiosa in a 1½-year-old sister.

Secondly, pemphigus vesicles in a child of one year followed by impetigo crusts in other places.

E. F. ROBB.

BLOOD TRANSFUSION VIA LONGITUDINAL SINUS: Harry Lowenburg (Arch. of Ped., April, 1921). Transfusion, as a valuable therapeutic measure, still remains unappreciated. The ease with which the longitudinal sinus route may be employed and the simplicity of the technic are but too little understood. The doctor names various indications for transfusions, but prefers to leave the decision as to the cases to be transfused to the judgment of the operator. He reminds us, however, that transfusion is our best method of supplying fresh, healthy, combative blood, and represents the best anti-toxic and anti-microbial agent to date revealed to us.

He has noted marked improvements in cases of spasmophilia where this method was used and it seems to him with the deficiency of calcium in the blood, together with the accompanying anemia, that to a marked or less degree is present in all these cases, that the lack of those elements is responsible for the state of nervous excitability found in this type of cases. In transfusing these children we raise the percentage of hemoglobin as well as the calcium content and thereby produce marked improvement.

The difficulty experienced in entering the veins of infants under 2 years of age and the ease with which they collapse have had a markedly deterrent influence upon the practice of transfusion at this age. It is known that the anterior fontanel remains open up to the eighteenth month. In many instances, it is patent even longer. The longitudinal sinus traverses this opening in the calvarium directly in the middle line from its posterior to its anterior angle. In the former situation, for all practical purposes, it lies just beneath the skin. Hence, it is readily available to puncture without danger to neighboring structures. The walls of the sinus are not rigid, neither are they adherent to bony structures. Hence, the introduction of fluid is made with comparative ease.

The sinus route is available until the ossification of the covering membrane of the fontanel is practically complete. In fact, ossification may be pretty well advanced before this pathway is no longer available.

The technic is a little complicated and you must have the proper apparatus to do the same.

In 13 transfusions, done by the sinus route, the writer has witnessed no bad effects.

When conditions in the scalp are normal, the sinus lies underneath the skin, but when there is considerable edema it may be a half inch or more below the surface, and is much more difficult to reach. The immediate effect of transfusion is almost dramatic. The tissues become suffused and glow with the ruddiness of apparent health. The ears, the toes, the finger tips, the nose, the lips and all visible mucous surfaces become red and lifelike. Immediate examination of the blood often shows a tremendous polycythemia, leucocytosis and sometimes over 100 per cent of hemoglobin, with all the blood elements increased. During the next 24 hours the secondary effects become apparent. The infant becomes pale again, with a marked reduction of all the blood elements. These gradually increase, and the general outward appearance of the patient improves. There is often a rapid rise in temperature immediately following transfusion, the pulse becomes rapid and the urine shows heavy deposits of urates. These soon disappear.

R. N. ANDREWS.

EVERYDAY PEDIATRICS—R. M. Pollitzer (Arch. of Ped., April, 1922): In most towns, and especially in rural communities, the general practitioner attends at least nine-tenths of all the sick babies and children. The specialist is seen most often only in desperate cases, or where feeding is the prime consideration. The general practitioner, who is a very busy and popular man, must have some idea of most of the varied branches of medicine and surgery. Yet it is essential that these men, who are the backbone of the profession, should be qualified to handle the majority of their patients in a proper manner. Therefore, the man must be properly trained in the rudiments of pediatrics. Very often he is, and again is not, but more often he does not take the time or trouble to carry out his teaching. After all, the basis for success in medicine, leaving aside all question of personality, is a certain amount of education, medical and otherwise, a moderate degree of common sense and, particularly, the cultivation of the powers of observation. To my mind, the man who fails most often in diagnosing a pediatric disease is the one who neglects to make a thorough physical examination. The writer has no hesitancy in saying that aside from an examination of the urine the vast majority of diagnoses are missed because the throat and ears are not looked into.

TONSILLITIS is extremely common in childhood, and by no means uncommon in infancy. Aside from fever and prostration, there are no clues.

PYELITIS is very common in infants and children, and impossible of recognition without examination of the urine.

SYPHILIS. No one really knows how prevalent congenital syphilis is, but the morbidity and mortality in infancy has been estimated as very high. The history is generally worthless in this respect; the diagnosis must be made by powers of observation. The writer emphasizes the point that it is comparatively easy at times to make a diagnosis, even to those who do not possess any extra diagnostic ability provided the little patient is thoroughly examined. The author's sole purpose is to show that while scientific medicine requires research and far more knowledge along many lines, yet today we are often not making use in

our daily work of many of the most elementary bits of knowledge which we have already acquired.

R. N. ANDREWS.

CEPHALIC BRUITS IN CHILDREN—George F. Still (Brit. Jour. Child. Dis., London, Oct.-Dec., 1921): Cephalic bruits were found in 17 out of 70 children with open fontanelle examined, and in 13 out of 130 with closed fontanelle. The youngest child in which a bruit was found was 5 months old, the oldest 15¼ years. Most of the bruits occurred in children under 4 years of age.

Still suggests that they may possibly be due to tortuosity of the carotids, at the base of the skull, which becomes less as the skull enlarges, thus accounting for the disappearance of the bruit in older children. Rickets and anemia, which have been advanced as causes of this bruit, were not a constant feature. Still thinks the bruit itself unimportant, but that it is important to know of its occurrence and innocence.

E. F. ROBB.

CAROTINEMIA—Alfred F. Hess and Victor C. Myers (Jour. of the A. M. A., Dec. 6, 1919): About a year ago one of the authors observed that two children in a ward containing about twenty-five infants, from one year to one year and a half in age, were developing a yellow complexion. This coloration was not confined to the face, but involved, to a less extent, the entire body, being most evident on the palms of the hands. The urine was amber and the stools normally yellow. It was noticed that these two children, and only these two, were receiving a daily ration of carrots in addition to their milk and cereal. It seemed as if this mild jaundiced hue might well be the result of the introduction into the body of a pigment rather than any pathologic condition. Two other children were accordingly fed carrots with the same result following, one five weeks later and the other seven. On omission of the carrots from the dietary, the skin became of a normal color again. This subject was pursued farther and the blood examined to see whether the coloring matter could be identified. The serum in the blood, as well as the plasma, was found to be distinctly yellow, much like that which is obtained in cases of jaundice. It was evident that they were dealing with a systemic pigmentation brought about by the introduction of an excess of carotin in the food. These pigments are very widely distributed among our foodstuffs, and it is probable that they frequently play a rôle in coloring the skin. They are nontoxic and cause no physiologic disturbance. The pigmentation may be brought about not only by carrots, but also by any food which contains the carotinoids in high degree—such as oranges, the yolk of eggs, spinach, beets, etc. Not all children will show good pigmentation.

In cases of carotinemia the urine was colored yellow as well as the serum. When a small quantity of concentrated carotin was ingested the pigment appeared rapidly in the urine. These observations are of interest in view of the fact that clinicians as well as physiologists consider that the urinary pigments are formed solely from bile or its derivatives.

R. N. ANDREWS.

BOOK REVIEWS

BOOKS RECEIVED FOR REVIEW

DISEASES OF THE THYROID GLAND. Arthur E. Hetzler, M.D., F.A.C.S., Professor of Surgery, University of Kansas School of Medicine; Surgeon Halstead Hospital, Halstead, Kansas; Surgeon St. Luke's Hospital and St. Mary's Hospital, Kansas City, Mo., and to Provident Hospital, Kansas City, Kansas. 245 pages, 106 original illustrations. St. Louis: C. V. Mosby Co., 1922. Cloth. \$5.00.

THE THYROID GLAND. Clinics of George W. Crile, M.D., and associates at Cleveland, Ohio. 228 pages. 106 illustrations. Cloth. \$5.00. Philadelphia and London. W. B. Saunders Co. 1922.

George Crile and his associates in "The Thyroid Gland" consider the thyroid gland from the standpoint of the various specialties, and a number of valuable points are brought out.

The importance of examination of the larynx is emphasized. About 10 per cent of the cases of exophthalmic goiter show paralysis before operation. Any laryngeal impairment that is the result of pathological condition of the thyroid gland is almost invariably unilateral. Where a bilateral paralysis is present it is usually caused by some lesion in the central nervous system, such as lues, or by a malignancy of the thyroid. At the Cleveland Clinic all goiter cases have a laryngoscopic examination preceding operation, subsequent to leaving the hospital, and then every one to six months afterward.

In toxic goiter an increased systolic and decreased diastolic blood pressure with resultant increased pulse pressure, as already brought out by Plummer and Taussig, is emphasized.

The prophylactic treatment carried out in Akron schools is explained in detail. Sodium iodide in .2 gram doses is used daily for ten consecutive days and repeated every spring and fall. Other methods, as inhalation of iodine, tincture of iodine, syrup of ferrous iodide, etc., are cited. The use of iodine or thyroid products in persons with adenomatous goiter is warned against. They state that about 90 per cent of all malignant tumors of the thyroid arise in fetal adenomata. Iodine given to pregnant women may prevent fetal adenomata, hence cancer of the thyroid in offspring.

Marine and Lenhart are quoted at length regarding the cause and prevention of goiter.

Basal metabolism estimations provide a valuable, although not a specific test, for the presence of hyperthyroidism. These are of value in borderline cases, but of little worth in the determination of operability of cases of hyperthyroidism. Other men, however, notably Plummer and Willius, feel that, in conjunction with other findings, it is a very valuable aid in determining operability and type of operation. A number of conditions that may give rise to increased basal metabolic readings are cited, as: fevers, anemia, leukemia, diabetes mellitus, cardiac dyspnea, asthma, and pituitary disorders.

Boothby and Sandiford, Means, and Du Bois are quoted frequently.

The Goetsch test is described at length and has been of distinct value to them in the differentiation of borderline cases of hyperthyroidism; it states that 89 per cent of the cases of exophthalmic goiter gave positive tests. This is at variance with the opinion of many other men who feel that the test is worth little.

Dr. Crile states that there are 105 papers in which favorable action of x-ray treatment is reported. Means and Aub believe that the chances of cure are as good as operative procedure. C. H. Mayo is quoted: "With x-ray, remissions may occur, as remissions occur without treatment or with several other methods of treatment. Our experience has been failure or but temporary benefit. It is possible that x-ray may destroy gland and produce hypothyroidism. It is difficult to regulate dosage and adds to difficulty of operation." Dr. Crile states the following disadvantages: (a) the dose required to produce a given effect is at best a guess; (b) relapses common; (c) the delay in unsuccessful cases leads to serious damage to certain organs, as myocardium, liver, etc.; (d) causes scar tissue and may result in myxedema. It is his opinion that surgery is by all means the treatment of choice.

The preoperative management is elaborated upon and has for its object the preparation of the patient in such a way that the operation will be attended by a minimum degree of shock; to prevent the patient from knowing when the operation is to be done, for several days previous a definite routine is adopted which includes putting the operating clothes on daily; a hypodermic of sterile water every morning; breakfast deferred, and daily administration of nitrous oxide in bedroom. The patient is informed that the latter is for the heart and he is never permitted to become unconscious.

The type of operation, whether ligation or primary thyroidectomy, is dependent upon the severity of the case. Extreme caution in the choice of the operation is advised. Thyroid extract, grains 2, is given the evening before and the morning of the operation to compensate for the removal of the thyroid tissue. This would appear unnecessary, as the manipulation of the thyroid causes the liberation of an excessive amount of thyroid into the blood.

Many other points are brought out that make Crile's book a very valuable reference work. It should be read not only by those interested in the thyroid, but by the profession at large.

A. E. MARK, M.D.

THE MANAGEMENT OF THE SICK INFANT. Langley Porter, B.S., M.D., M.R.C.S. (Eng.), L.R.C.P. (Lond.) Prof. of Clinical Pediatrics, University of California, Medical School, etc., and William E. Carter, M.D., Assistant in Pediatrics and Chief of Out-Patient Department, University of California, Medical School. 642 pages. St. Louis: C. V. Mosby Co., 1922. Cloth. \$7.50.

"The Management of the Sick Infant," by Dr. Langley Porter and Dr. William E. Carter, is, as the authors have pointed out in the preface, a book "which deals exclusively with the peculiarities of disease as it occurs in infants." Except for a short but valuable chapter on "General Considerations," the first 160 pages are given over to a consideration of the subject-matter of the entire field from the standpoint of symptomatology. Chapters on each of the

following subjects are presented: vomiting, diarrhea, constipation, nutrition, hemorrhage, pain and tenderness, convulsions and syncope, fever, and cough. The treatment of each of these subjects, while necessarily concise, is surprisingly complete and the reader finds that this portion of the book contains a very commendable differential diagnosis of these conditions in infancy. With such symptoms as constipation, diarrhea, and malnutrition, which not infrequently assume the form of disease entities in infants, the authors spend considerable time in a consideration of their treatment. This is especially valuable since every effort is made to avoid empiricism. The causes of the symptoms are explained and the measures advocated are shown to be directed at these basic factors.

The second part, a section of 320 pages, is given over to a consideration of the subject-matter arranged according to systems. Here also is found the same careful planning and conciseness of text which leaves out no important details that will be of value to the physician in the handling of sick infants. The authors have shown the happy faculty of emphasizing where practical importance demands emphasis and of saving space on things of theoretical or purely academic interest. They seem never to have lost sight of their expressed purpose, namely, to assist the medical man in the handling of his sick infants.

While the book has justified itself in its broad scope, conciseness and clearness of text, and extreme practicability in the first two sections, it remains for the third and last part to stamp the work as invaluable and indispensable to the physician treating diseases of infancy. This is divided into four chapters, one on each of the following subjects; methods, formulas and recipes, drugs, and poisoning. The first of these consists of 105 pages and describes accurately and simply all of the manipulative procedures necessary in the handling of sick infants. Whereas the authors might recommend colonic irrigations, intraperitoneal injection of fluid, puncture of the cisterna magna, etc., in parts one or two, this chapter in part three describes by text and numerous illustrations how these things are done. Under "formulas and recipes" the authors devote about 20 pages to the preparation of the foods that might be needed in the care of sick infants. Under the caption of "drugs," 34 pages are given over to a consideration of the various prescriptions that the authors have found useful in the treatment of the various conditions. The diseases are arranged in alphabetical order and under each is given, in tabular form, the prescriptions with instructions as to use. The last chapter, on "poisoning," consists of but four pages. The first three consider the general immediate procedures necessary in cases of poisoning while the last page is a table of the commoner poisons with the antidote, chemical and physiological, for each.

The evidence of painstaking preparation does not end with the closing chapter of the text itself, for all the wealth of information that it contains is made easily accessible to the reader by an unusually well prepared and complete index, which contributes in no small measure to the extreme value of the work. It is hard to imagine a more complete, yet concise and entirely practical treatment of the subject, "The Management of the Sick Infant," than is contained within the pages of this book.

W. RAY SHANNON, M.D.

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Aurelius, John R.....	U. of Minn., M. B., 1922.....	1072 Dayton, St. Paul.
Bohnsack, Eleanore M.....	U. of Minn., M. B., 1922.....	1302 13th St. S., Fargo, N. D.
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Collier, Sidney W.....	U. of Minn., M. B., 1922.....	Minneapolis General Hospital.
Culligan, Leo Courtney.....	U. of Minn., M. B., 1922.....	2069 Iglehart, St. Paul.
Dixon, Robert Kenneth.....	U. of Minn., M. B., 1922.....	St. Charles, Minn.
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Gowan, Lawrence R.....	U. of Minn., M. B., 1922.....	711 Essex St. S. E., Minneapolis.
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Huchthausen, Magdalene.....	U. of Minn., M. B., 1922.....	County Hospital, Los Angeles, Cal.
Jensen, Harry C.....	U. of Minn., M. B., 1921.....	919 Fulton St. S. E., Minneapolis.
Josewski, Raymond J.....	U. of Ill., Cert. Med., 1922.....	Maxbass, N. D.
Kamman, Gordon Richard....	U. of Minn., M. B., 1922.....	City Hospital, St. Paul.
Lax, Morris H.....	U. of Minn., M. B., 1922.....	975 Marshall, St. Paul.
Leland, Harold R.....	U. of Minn., M. B., 1922.....	Kenyon, Minn.
Liddicoat, Arthur Gordon....	U. of Minn., M. B., 1922.....	Biwabik, Minn.
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Wilson, Warren E.....	U. of Minn., M. B., 1922.....	Northfield, Minn.

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Aland, Albert Harold.....	Western Reserve, M. D., 1916....	734 Lowry Bldg., St. Paul.
Bacon, Lyle Cholwell, Jr.....	U. of Mich., M. D., 1921.....	St. Paul, Minn.
Bowman, Leonard Jas.....	Baltimore Med., M. D., 1893.....	Borup, Minn.
Dixon, James F.....	P. & S., St. Louis, Mo., M. D., 1905	Rives, Mo.
Jacobson, David Jackson.....	Drake, M. D., 1913.....	1916 3rd Ave. S., Minneapolis.
Joannides, Minas	Wash. U., Mo., M. D., 1921.....	2953 Bloomington, Minneapolis.
Norris, John F.....	P. & S., Baltimore, M. D., 1900..	St. Peter, Minn.
Northrup, Laurance Curtis....	U. of Neb., M. D., 1919.....	1035 E. Franklin, Minneapolis.
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ORIGINAL ARTICLES

SOME OBSERVATIONS ON THE EARLY DIAGNOSIS OF TUBERCULOSIS*

F. M. POTTENGER, M.D.,
Monrovia, Calif.

Tuberculosis, until a comparatively short time ago, was considered a hopelessly incurable disease. One of the most potent factors in preventing progress at the present time is this overpowering pessimistic idea regarding the disease, which still lingers in the minds of both medical men and laymen. While medical men here and there throughout the world have been convinced of its curability for a long period of time, it is only within the last five or six decades that there has been any organized effort to give patients suffering from tuberculosis the same chance for life as is given to those suffering from other diseases.

Today, if we measure the curability of tuberculosis with that of other serious diseases, we must say that it is one of the most curable. I use the word "curable" advisedly, meaning clinical cure, i. e., a disappearance of clinical manifestations. If we are to estimate the manner in which this disease will yield to known methods of therapy, we must take as our measure the best work that is being done—not the poorest. Those who are most competent to treat this disease find that nearly all early stage cases, if treated under proper conditions and for a sufficient length of time, with a satisfactory co-operation, will yield a clinical healing. The statistics of the curability of this disease, however, are largely taken from reports of sanatoria, in which patients have been treated for an insufficient length of time, and in many cases under circumstances that were far from ideal. As a result such reports may show an arrestment or clinical healing of not more than ten, fifteen or twenty per cent in early cases. In fact, most of the statistics will be under fifty per cent. In mak-

ing up these statistics, however, it should be understood that all patients remaining under treatment for a minimum of three months are counted. Such a method is a gross injustice to the cause of tuberculosis.

From my experience, I have no hesitancy in saying that ninety per cent of early cases of tuberculosis could secure a clinical healing. Regardless of this statement, institutions which are best prepared for the treatment of tuberculosis, and men who are most conversant with the application of the methods which have proven to be of value, are devoting most of their time and effort to the treatment of far advanced cases. Important reasons for this are: (1) a disbelief on the part of both laymen and physicians in general, in the curability of the disease; (2) a failure on the part of physicians to make early diagnoses, and an unwillingness on the part of patients to accept them when made; (3) when the diagnosis is made, a failure to secure for the patient the same intelligent, scientific treatment that would be secured were he suffering from some other disease; (4) a failure to appreciate the nature of the disease and the time element in its cure. It is perfectly evident that the blame for not securing better results lies about equally with the profession and the laymen.

In the Pottenger Sanatorium, during the last ten years, we have not failed to secure an arrestment in a single early stage case of tuberculosis, that remained under treatment for a minimum of six months. It must be distinctly understood, however, that six months is not the time that early cases of tuberculosis should be treated. They should be treated until a favorable result has been attained, or until it has been distinctly proven that it cannot be attained. In order to attain these results, some patients were treated for a period of about two years, and several others were treated from seven months to a year. The time element is the most important element in the treatment of tuberculosis—the time when the diagnosis is made; the time when the treatment is instituted, and the length of time that it is carried out. The amount of time that must be given to the treatment

*Read by invitation before the Consulting Medical Staff of the Lymanhurst School for Tuberculous Children, Minneapolis, April 8, 1922.

varies with the individual. Had we set any definite length of time for treatment, whether it were three months, six months, nine months, or a year, our statistics would have been lowered. Had we taken six months as the limit, we would have probably cut our statistics in half. It is interesting to know, however, that all of these patients, so far as I have been able to follow them, with two exceptions, have remained free from active disease since. Two relapsed and are again well, and have remained so for several years.

The important thing about these results is not that they have been attained, but the manner in which they have been attained. They have been attained because we have recognized that early tuberculosis is curable, but not curable regardless of conditions, nor in any stated time. It is just as reasonable for surgeons to report the results of operations after five, ten, or fifteen minutes' operation, as it is for those who are treating tuberculosis to base their statistics on three, six, or nine months' treatment.

While insisting that early tuberculosis is curable, I do not wish to leave the impression that advanced tuberculosis is incurable. Many advanced cases can secure a quiescence or an arrestment of the active process, and live lives of usefulness for many years, but the difficulties of obtaining such a result are infinitely greater and the danger surrounding the patient during his after-life are so many and so great, that the result is much less satisfactory and much less permanent. If all the patients who spend many months in trying to secure a healing when the disease has become far advanced, would put in half the amount of time and half the amount of money, during the early period of their disease, they would secure a far better and far more satisfactory result. Most patients who have had a severe advanced tuberculosis, even if they get the best result, are somewhat hampered and obliged to work at a lower state of efficiency than they would, had they received early treatment.

The physician should be competent to make an early diagnosis of tuberculosis, either himself or with the aid of some specialist. The patient should be willing to have such a diagnosis and anxious to co-operate in cure when it has been made. Too often a diagnosis of early tuberculosis is made and the patient goes from doctor to doctor until

he finds it refuted. A negative diagnosis makes him happy for a time, but it is a happiness that too often proves shortlived and costly. Every man who has tuberculosis in the early stage should be delighted to have an early diagnosis made, because this gives him his best opportunity of having his efficiency restored.

The importance of early diagnosis must be impressed as firmly upon the minds of the laymen as upon the profession in general. Aside from the result obtained and the actual outlay for treatment, early diagnosis is demanded because of the difficulties which attend cure. Early tuberculosis, at best, will take the average man away from his business or profession for a period of from six months to a year. It takes a high degree of confidence on the part of the layman to be willing to accept such a program. Those who accept the diagnosis and work faithfully for the healing are heroes; but how much better it is to accept the diagnosis when the disease is curable and when full efficiency may be restored, rather than wait until the outcome is questionable and the best result that can be attained is accompanied by a certain degree of reduced efficiency.

How is an early diagnosis to be made? As specialists we discuss the finer points of diagnosis. There is probably no diagnostic procedure in medicine that is more difficult than that of deciding whether or not in certain doubtful cases an active tuberculosis is present or absent. These, however, are problems for specialists rather than for general medical men. The general medical man, however, should understand the nature of tuberculosis, and should be able to make a probable diagnosis in nearly all instances. This he can do if he will only acquaint himself with the diagnostic knowledge that we possess today. The most important thing for the general man to do is to study his clinical history. A clinical history will give a fairly definite idea of the presence or absence of tuberculosis in practically all cases that are beyond the earliest stages, and in a very large per cent of those of the early type—probably eighty per cent or more. But this history must be taken carefully, and the symptoms weighed. We, as specialists, have taught so long that auscultation is the most important measure in physical examination and that we can rely mostly upon the proper interpretation of data obtained by this procedure, that it seems to be generally accepted that the same is

true for those who are not constantly practicing auscultation. But such is not the truth. I have seen many men make an early diagnosis of early tuberculosis on a clinical history, but when applying the stethoscope, and failing to find what seemed to them to be definite signs of tuberculosis, assume that their suspected diagnosis was wrong. If there were some definite sound which was always present when early active tuberculosis exists, the case would be different. But there is none. You may have roughness; you may have harshness; you may have diminished respiratory note; respiration may be prolonged, or it may not be; and all these signs may be found in a lung which is not the seat of early tuberculosis.. Râles may be present, or they may not be present. So, after all, the auscultatory findings are indefinite and must be interpreted in each case according to a certain amount of experience, and according to the conditions found.

Percussion, likewise, is a difficult thing and there are comparatively few men who are masters in its use. Men are too apt to think that the changes they find on auscultation and percussion are due to the disease that they are looking for, but such is not necessarily the case. We must take the lung as we find it, before tuberculosis exists in it, and then endeavor to find out the changes that are produced by the tuberculous process itself.

At this point, I want to say a few words regarding textbooks. Textbooks are not infallible. They should represent a good opinion on the subject discussed at the time they are written. All textbooks contain a large element of error. We are apt to consider those things which are accepted as facts, and resist all knowledge which differs from them. One's opinion is based on his accepted knowledge and experience. So it is but natural that opinions of different individuals should differ, at least in some particular, upon nearly all subjects. It is essential for examiners to learn the true value of existing medical teaching, and stand ready to alter it as necessary, in dealing with an individual case. Textbooks deal largely with ideal cases. Practice deals largely with exceptions.

If the first sign of tuberculosis were a roughened breathing, as is so generally taught, or a note accompanied by fine râles, do you suppose it would be the same if the patient had had a previous pleurisy, pneumonia, influenza, or bronchitis,

which had left their pathologic changes in the lung? Manifestly not. You cannot give the same interpretation to data found in the chest which has been free from such diseases, as you do in the chest which has been affected by them.

I wish to insist that the most important thing in the diagnosis of tuberculosis is the careful analysis of the clinical history. In my work as a clinician. I have endeavored to simplify clinical history. I found I could do this best by having some definite idea as to the cause of the various symptoms. We can find some twenty-five, thirty, or more symptoms accompanying early tuberculosis. These symptoms differ greatly, manifest themselves in widely separated tissues, and should have varied degrees of importance attached to them; but if we come to examine them carefully, it is evident that there are only three factors operating to produce them—the toxins, reflex irritation, and the disease process as it manifests itself locally in the tissues. This has caused me to offer the following classification of the common symptoms of pulmonary tuberculosis:

ETIOLOGICAL CLASSIFICATION OF COMMON SYMPTOMS OF PULMONARY TUBERCULOSIS

GROUP I.

SYMPTOMS DUE TO TOXEMIA

<i>Caused by</i>		<i>Symptoms</i>
<i>Harmful Stimulation of</i>		
I. Nervous System in General	}	1. Malaise
II. Endocrine System in General		2. Lack of Endurance
		3. Loss of Strength
		4. Nerve Instability
III. Sympathetic Nervous System	}	5. Diminished Digestive Activity
IV. Sympathicotropic Endocrines. Particularly Adrenals and Thyroid		6. Increased Metabolic Rate
		7. Loss of Weight
		8. Increased Pulse Rate
		9. Night Sweats
		10. Temperature (partially)

GROUP II.

SYMPTOMS DUE TO REFLEX CAUSE

Hoarseness	Loss of Weight
Tickling in Larynx	Circulatory Disturbances
Cough	Chest and Shoulder Pains
Digestive Disturbances	Spasm of Muscles of Shoulder Girdle and Diaphragm
(Hypermotility and Hypersecretion)	Flushing of Face

GROUP III.

SYMPTOMS AND SYNDROMES DUE TO THE PROCESS *per se*

Spitting of Blood
 Sputum
 Frequent and Protracted Colds (Tuberculous Bronchitis)
 Pleurisy (Tuberculosis of the Pleura)

An examination of this grouping of symptoms, together with careful application of them in the clinic, will show that those of Group I, when caused by tuberculosis, are only present at the time that such process is clinically active. This group also may be present in any other infection; also in diseases of general nerve instability, and as a result of overwork and general conditions of exhaustion. So one must be very careful in making a diagnosis upon this group of symptoms alone.

Symptoms of Group II result from irritation that takes place through the inflammatory processes that occur in tuberculous areas. Consequently they may be present as long as the inflammatory process remains in the lung. It is characteristic of these that they are all expressed in tissues other than the lung, but in tissues which are connected with the sensory nerves which come from the lung. A combination of some of the reflex symptoms with those of the toxic symptoms aids us in placing the inflammation in the lung itself.

Group III, which is made up of two symptoms and two syndromes, points more directly to the lung itself, but it can be readily seen that the syndromes representing tuberculous bronchitis and pleurisy, both contain symptoms belonging to Group I and Group II.

When one familiarizes himself with this classification of symptoms, he will see that there are only three factors operating to produce them: (1) general nerve and endocrine stimulation; (2) reflex irritation; (3) the local process as it exists in the lung tissue. While the third group contains the most important individual symptoms, yet by combining the various symptoms from the various groups, one can soon learn to differentiate active and quiescent clinical tuberculosis. In my own experience, I consider that this classification has given me far greater satisfaction than the old method of considering symptoms as constitutional and local.

An active tuberculous process should be suspected or eliminated by a careful study of the symptoms according to this classification, in at least 80 and probably 90 per cent of cases.

ACUTE APPENDICITIS*

 ROBERT EARL, M.D., F.A.C.S.

I hesitate to bring before you for discussion a disease so common and well understood as acute appendicitis because even many laymen are sufficiently familiar with its symptoms to make a diagnosis in typical cases. The layman as well as the physician now recognizes the fact that the only safety lies in early diagnosis and early operation.

Although most cases of acute appendicitis are easily diagnosed, there will occur an occasional case where even the most experienced diagnosticians will have difficulty in making a differential diagnosis, especially during the early hours of an attack. Treves says, very truly, that almost all acute troubles within the abdomen begin with the same group of symptoms, and that until some hours have elapsed it is often impossible to say whether a violent abdominal crisis is due to the perforation of an appendix or other portion of the intestine, the bursting of a pyosalpinx, the strangulation of a loop of gut, the passage of a gallstone, the rupture of a hydatid cyst, an acute infection of the pancreas, the twisting of the pedicle of an ovarian tumor, or a sudden intraperitoneal hemorrhage.

In acute appendicitis, the first symptom is intermittent cramping or colicky pain in the epigastrium or around the umbilicus which continues about twenty-four hours. The spastic closure of the ileocecal valve is induced reflexly by the irritable and inflamed appendix, the pain being caused by the small intestine trying to force an opening through the ileocecal valve. If the activity of the small intestine is aggravated by laxatives, the pain will be increased and reverse peristalsis will cause the second symptom, which is nausea and vomiting. The vomiting usually occurs only once, but may occur two or three times. The third symptom to appear is general abdominal tenderness. The fourth is increased temperature from infection. The rise in temperature will occur in from two to twenty-four hours after the onset of pain. The fifth symptom is leukocytosis. The order of appearance of these symptoms is important. Dr. J. B. Murphy said, "If the nausea, vomit-

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ing or temperature precedes the pain, I feel certain the case is not one of appendicitis."

After twenty-four hours the pain, tenderness, and rigidity settles in the lower right quadrant at McBurney's point, and the pain changes from a colicky to a constant pain.

If the pus in the appendix (which is a condition of empyema) drains into the bowel, all symptoms, increased temperature, pulse, and leukocytosis, improve. If the appendix perforates, the pain will become diminished but the other symptoms will continue. As the appendix has no peritoneal coat along the mesenteric border, it usually perforates here because this point offers the least resistance. In gangrene the pains become less as time advances but the other symptoms progress. Exudates are thrown out around the area, this being one of nature's efforts to wall it off.

In acute appendicitis we must distinguish between true intestinal obstruction and physiological obstruction to the passage of gas and feces caused by nature's attempt to stop peristalsis and wall off the infected area. The sphincter ani muscle prevents the escape of gas, thus converting the large bowel into a cofferdam. The ileocecal valve becomes contracted reflexly, which causes distention of the small bowel. This distention confines the appendix to the right iliac region, in addition to which the omentum usually surrounds and further walls off the infected appendix. As soon as the pathological condition in the appendix has subsided, the reflex spasm of the sphincters will relax, and gas and feces will again pass.

If cathartics, water or food are given before the inflammatory process has subsided or become localized, they will start peristaltic action, thereby spreading the infection. The patient will probably get worse and may die because the cathartics given have prevented a localization of the inflammation.

If the patient lives from forty-eight to seventy-two hours, the lymphatics are blocked and adhesions, which localize the inflammatory process, are formed. These patients can now be operated safely and will recover in spite of the fact that an abscess has developed with considerable sloughing of tissues.

As a rule in the acute attacks there is a leukocytosis of 12,000 to 25,000. Usually the degree is the expression of the peritoneal irritation. The higher the percentage of polymorphonuclears the more virulent the infection. A high count may

mean a vigorous reaction to the infection; a low count may mean either a poor reaction and hence an unfavorable condition of the patient, or it may indicate a very mild degree of infection with a normal reactivity of the patient.

Appendicitis starting with a chill indicates gangrene of either the mucous membrane or the outer layers of the appendix. A chill followed by fever indicates infection. A chill not followed by fever indicates a nervous chill.

Fever is always present in the early stages, even in the mildest forms, and is a most important feature. Some surgeons will not operate on a case in which they are confident that no fever had been present in the first thirty-six hours of the disease.

Pain over the region of the appendix without gastric symptoms is usually not due to appendicitis but to salpingitis, oophoritis, or some one of a large number of diseased conditions referring pain to this region. Of referred pain, that of pleurisy especially in children is a frequent cause. The referred pain in pleurisy is relieved when the patient pauses in breathing; the surgeon's palpating hand can be pressed into the abdomen, without causing pain or tenderness, between each breath and when breathing is stopped. These patients will not be relieved of their pain unless the real cause of the pain is removed, in addition to the removal of the appendix.

A child's appendix is large at the top like a funnel. An adult's appendix is smaller at its junction with the cecum. Therefore, an adult's appendix does not drain as readily as a child's appendix and is more prone to form an empyema. The submucous coat of a child's appendix is very delicate and poorly developed until after the twelfth year. A child's appendix will therefore perforate much more quickly than an adult's, for which reason the symptoms of perforation will be early symptoms of appendicitis in children.

As some attacks of appendicitis progress much more rapidly than others, it is impossible to judge the extent of spread of the infection as measured by hours or days. Physical examination should be our guide instead of the element of time. It is true that a case seen within twenty-four hours would, in most instances, be an early case, but this is not always so, as we sometimes find signs of severe infection with pus about the appendix within the

first twenty-four hours after the onset of symptoms. On the other hand, the disease may remain in the first stage for a considerable time, in which event the early operation can be done after several days without danger.

The physical signs which would lead us to conclude that the patient is still in the first stage of his attack are: (1) the upper abdomen and left side are still soft and not tender; (2) there is no pain in the lumbar regions, at least not in the left; and (3) the pressure pain and localized reflex contractions are limited to the region of McBurney's point without any extensive dullness or definite resistance.

When a patient is seen with the history of an attack of acute appendicitis, and the above physical findings are present, it is our duty to urge immediate operation, thereby securing the lowest possible mortality, which is well illustrated by the following statistics given out by De Quervain: 1,723 cases operated upon on the first day of illness with mortality of 0.69 per cent; 1,389 cases on the second day, 4.7 per cent; 788 cases on the third day, 10.7 per cent; 197 cases on the fourth and following days, 21.2 per cent; giving a total of 5,097 cases with an average mortality of 8.1 per cent. In the last two groups the patients reached the surgeon much too late, and doubtless some in the second group could have been diagnosed earlier than they were. At any rate, there should be no third and fourth days of appendicitis, so at the least calculation, 1,985 out of 5,097 cases were late or mishandled cases.

It may be stated that in cases of acute appendicitis which have been permitted to progress to the stage of abscess formation or the development of complications, someone has procrastinated to the point of mismanagement. When the mortality in acute appendicitis operated during the first twenty-four hours is less than 1 per cent, it behooves us to educate the public to the necessity of calling a physician who may diagnose the case and have it operated early in order that the mortality may be kept low.

After the patient has passed the first stage and the process has not become localized, we will find the abdomen everywhere sensitive to light percussion, pressure in the lumbar regions will cause pain, palpation will produce extensive reflex muscular contraction. With these findings it is

quite certain that there is considerable involvement of the peritoneum.

When we see a patient on the third or fourth day with the inflamed area undergoing incapsulation or already subsiding, with an area of muscular rigidity, possibly mass formation, tenderness to pressure, dullness on percussion or tympany from an overlying distended bowel (the rest of the abdomen being soft and but slightly distended and not sensitive to pressure), the process will in all probability be a localized one progressing toward abscess formation, in which case we should pursue a course of watchful waiting lest we disturb the defenses that nature has built up. If the general and local symptoms show no signs of subsiding, and especially if they increase, an operation is indicated for the purpose of evacuating the pus and removing the appendix if this can be easily accomplished without much manipulation. If a secondary collection of pus forms within the second or third week, this should be evacuated. The formation of a secondary abscess is indicated by the fact that improvement stops short, the temperature rises again and takes the form of an abscess chart. In such a case it is probable that residual abscesses are forming. Experience teaches us that there are several points at which these abscesses are most likely to form. First in frequency is Douglas' pouch, where an abscess can at once be recognized by a rectal examination, when we find a protrusion and edema of the mucous membrane, with mucous discharge from the rectum and tenesmus. An abscess in the flank is recognized by localized pain on pressure, muscular rigidity and dullness. After the third week, a subphrenic abscess is the most likely complication.

When physical examination fails to reveal anything abnormal in these locations and the symptoms still persist, it is probable that small abscesses exist between the coils of the intestines; in this case it is best to await their spontaneous absorption, as searching for an abscess in this locality may do more harm than good.

A generalized peritonitis may be caused by a severe initial septic infection of the whole peritoneum. This is usually due to an extensive perforation which has flooded the peritoneal cavity with septic material, or to an acute gangrene of the appendix. In generalized peritonitis the patient looks very sick, has a rapid threadlike pulse, has

a normal or subnormal temperature in the extremities and in the axilla, but a high rectal temperature, with dry tongue and persistence of vomiting. If these symptoms appear suddenly after the patient has been sick a few days, it would probably mean that an abscess, which was originally localized, has ruptured into the general peritoneal cavity.

In acute appendicitis with general peritonitis the prognosis depends more upon the virulence of the micro-organisms than upon the extent of the peritoneal involvement. We have all seen cases in which the temperature and pulse were good, the reflex muscular contractions were slight, there being no intestinal paralysis or vomiting, but in which the intestines will be floating in pus when the abdomen is opened. In these cases the peritonitis is not as widespread as it appears and there is slight virulence of the pus organisms; in children, for instance, pneumococcic peritonitis is comparatively harmless, while in other cases the peritoneal sepsis has terminated fatally before any anatomical changes in the peritoneum have had time to occur.

The differentiation of these various pathological processes is of importance. If we have allowed the opportunity of an early operation to slip by, and the case is in the stage of early exudation of a mild character, we may await the localization of the process; but if a diagnosis of diffuse septic peritonitis has been made, the abdomen must be opened preferably at several places and thoroughly drained. If the appendix is free, it should be removed at the same time.

The peritoneum, if spread out, would cover the entire body surface. There is as much peritoneum as skin. The peritoneum, if unhindered, can absorb from three to eight per cent of the body weight in one hour, being equivalent to the entire body weight in twenty-four hours. There is normally a movement along the peritoneum toward the diaphragm. A pigment in a normal peritoneum will travel from the pelvis to the diaphragm in about twenty minutes. The peritoneum in the region of the diaphragm has the greatest power of absorption. The omentum comes second. The peritoneum in the region of the appendix, third. The parietal peritoneum is fourth. The pelvic peritoneum comes last with practically no absorptive ability.

Death in pelvic peritonitis is from pelvic cellulitis and not from peritonitis. The cause of

death from peritonitis is due to: (1) toxemia through absorption from the peritoneum; (2) obstruction from paralysis of the bowel causing absorption of intestinal toxins; (3) secondary complications, as ileus, etc.

If the spread of infection on the peritoneum is not too rapid, the system will wall off and isolate the inflamed area. Localized peritonitis is seldom a cause of death.

The cause of travel of septic material from the pelvis toward the diaphragm is probably the pump-like action of the diaphragm, causing positive and negative pressure which sucks the infection upward, thereby spreading it over the peritoneum. To prevent this, nature causes more or less of a fixation of the diaphragm during an attack of peritonitis. The peristaltic action of the intestines will carry the infection around in the peritoneal cavity. Nature, therefore, causes a paralysis of the bowel for the purpose of limiting and localizing the infection. Bodily movements also tend to spread peritoneal infection.

Based on the above facts, the treatment of peritonitis should include the taking of nothing by mouth—not even water—for the purpose of preventing peristalsis. In an attack of peritonitis nature empties the stomach by vomiting. If the irritation is more extensive, the duodenum is next emptied. In this way, nature shows that it does not want anything to stimulate peristalsis. A glass of water before breakfast starts peristalsis, and a bowel movement is encouraged, for which reason no water should be given by mouth until the peritonitis has become localized.

The patient should be placed in Fowler's position for the purpose of diminishing the absorption of toxins by favoring the gravity movement of the toxic products in the peritoneal cavity from the diaphragmatic area with its highest rate of absorbability to the pelvic area with its lowest rate of absorbability. The patient should also be turned toward the side in which the drain is placed. Some surgeons claim very good results from placing the patient in bed on his face for the purpose of facilitating drainage by getting the wound at the lowest point of the peritoneal cavity.

The patients should all have proctoclysis by Murphy's method, which furnishes fluid to the body and diminishes the rate of absorption of toxins from the peritoneal cavity. If the blood vessels are well filled and distended they do not

need so much fluid and will therefore absorb less fluid from the peritoneum. If we give normal saline solution by rectum, the patient will become overloaded with salt, which will have a deleterious effect on the kidneys and cause edema of the body and great thirst. We do not drink salt water normally. Patients will absorb more plain water than normal saline. Such a patient is liable to develop acidosis. Therefore, we should add glucose to the tap water to make a 10 per cent solution, which will add many calories per day to the patient's nourishment. As a further means of preventing acidosis, sodium bicarbonate should also be added to the tap water in similar amount.

Many nurses do not use the proper technique in giving the Murphy drip. The surgeon must, therefore, watch the giving of the proctoclysis until each new nurse has been thoroughly trained. The supply container should be at the end of the bed and the tube must come up between the patient's limbs. A bent hard rubber or glass tube with a bulb on the end is much less liable to be expelled than the ordinary rubber tube or catheter which has no bulb to rest against the inner edge of the sphincter ani. It is well to bend this tube to an angle of 35 degrees so that it will not impinge on the rectal mucous membrane, causing a desire to stool. A hot water bag, covered with towels, should be placed under the tube. This will also help to elevate the tube before it enters the rectum. There must be a "Y" on the tube with a bypass to the top of the can, which will permit the escape of gas and allow the backing up of fluid through the tube into the container without causing expulsion of the rectal tube. The can should be elevated four feet. The water in the container must be kept warm by any one of several well known methods.

Proctoclysis should not be used in unlocalized septic peritonitis during the first twenty-four hours as it causes peristalsis, which tends to spread infection and hinder localization. Therefore, the body fluids must be compensated, toxins eliminated and thirst alleviated in some other way. Our only other method of giving fluid during the period of localization of the peritonitis is by hypodermoclysis. A patient should be given at least 1,000 c.c. of water every twenty-four hours. Hypodermoclysis is best given by the method described by Bartlett in his book on "After-Treatment of Surgical Patients," which, in brief, consists of instilling

freshly distilled sterile water through a regular hypodermic needle (No. 18) three inches long attached to a rubber tube one-half inch in diameter and four feet long, using a visible dropper and clamp, the same as is used in proctoclysis. The water is heated to between 100 and 110 degrees and poured into the warm container, which is attached to an adjustable pole. The needle is first thrust through a square fold of gauze six ply thick before being introduced under the skin. This prevents the hand touching the needle or skin which has been previously cleansed with iodine or alcohol. After the fluid has been allowed to fill the tube and needle so all air is expelled, the needle is plunged up to its flange in the subcutaneous tissue near the outer border of the pectoral muscles midway between the nipple and the head of the humerus. By this method the fluid spreads into the subcutaneous tissue of both the axillæ and breast and is absorbed much more rapidly than when given under the breast alone. The needle is held in position by a strip of adhesive over the sterile gauze.

Lavage must be used often enough to keep the stomach empty of secretions and regurgitated toxic substances, thus preventing their absorption, gastric dilatation and peristalsis.

Morphine should be given regularly, as it will paralyze the intestine for four hours, reduce respiration, prevent absorption, minimize the spread of infection, relieve pain, restlessness and sleeplessness.

If intestinal obstruction develops, the best treatment will consist of making a left rectus incision under local anesthesia, pick up a loop of jejunum which is heavy and full of toxic fluid, put in a tube with two purse string sutures and drop the jejunum back without any further disturbance. Do not hunt for the point of obstruction. If the patient is vomiting, a free flow of toxic material is obtained. If the ileum is opened further down we will get mostly gas with very little fluid drainage. After the tube has been introduced into the jejunum keep on washing the stomach and give plenty of fluids.

No food should be allowed by mouth until the symptoms have subsided to such an extent that the patient has tolerated small amounts of water by mouth for twenty-four hours without causing pain or vomiting. When feeding is started, carbohydrate fluids should be given first because they com-

bat the acidosis brought on by the combined infection and starvation.

After an attack of acute appendicitis, in which the appendix was not removed, an interval of six months should elapse before the appendix is removed. By this time the adhesions will, to a large extent, have been absorbed so the operation can be performed with much greater ease and safety than if performed earlier.

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CONDITIONS SIMULATING AN ACUTE LEUKEMIA* (ACUTE BENIGN LEUKEMIA)

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The title of this paper is not intended to mislead. There is no such thing as benign leukemia. The correct title should be "Conditions Simulating An Acute Benign Leukemia."

In 1913, R. C. Cabot¹ commented upon the occurrence of lymphocytosis in mild infections. He looked upon it as an unexplained substitution of lymphocytosis for the more usual polymorphonuclear leukocytosis.

In 1915, Hall² reported to the Royal Society of Medicine a case resembling acute lymphatic leukemia with recovery, in a young adult.

In 1920, Sprunt and Evans³ described six similar cases.

Sprunt and Evans' cases were all young adults between 23 and 29. All had symptoms of a mild infection for from a few days to three weeks before the first examination, with soreness in the head, neck and shoulders. The course of the fever ran from 4 to 10 days, after which there was a gradual recovery from symptoms and a return of the blood to normal. The lymphocyte percentages during the height of the attack were sometimes as great as in acute leukemia, the total number of white cells being never over 20,000. There was, however, a

noticeable absence of fragility and of degeneration forms.

It was of interest to hear Professor Daland say last evening that 50 per cent of focal infections show a lymphocytosis, and that such a blood finding is of considerable value as indicating the probability of a concealed process.

In March, 1921, Bloedorn and Houghton⁴ reported three cases, all evidently of the same type, with recovery. They proposed the name "Acute Benign Lymphoblastosis," as covering the essential features of the disease, because of the peculiar blood picture which is common to all of these cases. Someone else has suggested that the disease be called "Infective Mononucleosis."

Three cases of the same sort have come under our observation, or that of colleagues, who have given us the privilege of studying them. Undoubtedly many more have not been reported.

The striking features of the clinical condition are these:

1. An acute febrile disease, usually with a local infectious, but non-suppurative process.
2. Enlargement of lymphatic glands of the neck, axillæ or groins, or combination of these, and enlargement of the spleen.
3. A relative increase in the mononuclear white cells, either with or without a moderate leucocytosis, less than 20,000 usually.
4. The occurrence of certain white blood cells difficult to classify, but which are generally assigned as lymphoblasts.
5. Recovery.

In all the cases reported, the similarity of the blood picture to that of acute lymphatic leukemia was noticed. In fact, it is this possibility which causes the physician most concern, and has led to the observation of the return of the blood to normal without recurrence. Most of those affected have been young adults.

In children it is, of course, quite common to find blood pictures suggesting leukemia after pertussis, and some other infectious processes, but in them very little difficulty is experienced in excluding leukemia from consideration. In children too the hematologist tells us the types of white cells which are found are easily recognizable and classified. The cases in adults under discussion show a quite different blood picture; the white count may not be above normal, the lymphocyte total is raised in percentage at the expense of the polymorphonuclear elements, but there always are found in

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some of the films peculiar cells of the lymphoblastic type, which are not present in children. The total white count has never been strikingly raised; sometimes it is even lower than normal. In none of our cases was the count over 20,000 at any time.

Clinically, unless the differential blood count were made, none of these would cause much uneasiness. Enlargement of the spleen and lymphatic glands naturally suggests the blood examination, and when this comes back showing an increased lymphocyte percentage, possibly up to 92 per cent, leukemia presents as a possibility. As a matter of fact, the hematologist cannot give us an absolute differential diagnosis; it is the clinical course which determines the benign character of the illness. It is quite common to encounter such a differential count, as above described, in Vincent's angina, but it must not be forgotten that a malignant acute leukemia has begun with acute infection of the mouth as well. Furthermore, Vincent's angina often is accompanied by leucocyte counts of the normal polymorphonuclear type. It has been shown also that the lymphocytosis we speak of in this paper may be found in connection with various other mild infections, especially of the upper respiratory tract or the skin. Cabot's three early cases were associated with mild wound infection, boils, or streptococcic adenitis of tonsillar origin.

One of the cases here reported had mumps two weeks before the onset of his present illness; another had a frontal sinus infection one month previously; another had a Vincent's angina; and a fourth, not reported here, was also a Vincent's angina, with a marked lymphocytosis and a lymphatic adenitis, including an enlarged spleen—all recovering promptly and remaining well. It has been possible in all these cases to exclude syphilis, suppuration and malaria.

Case 1. Multipara, aged 30, with a two months' old baby. She had double mastitis early in the puerperium which had healed six weeks before. One month before the onset she had what was considered an attack of grippe followed by a slight infection of a frontal sinus. This also recovered promptly, but she had not gained to her former condition of health. The child was weaned ten days before. Temperature, 99 to 103. First blood examined showed 75 per cent Hb., 4,500,000 erythrocytes, 10,200 leucocytes, of which 61 per cent were lymphocytes. The urine showed a large trace of albumin and a trace of sugar, which persisted several days and was proven to be lactose. There were no casts. The spleen was found to be palpable at first examination and continued to enlarge during the first week of illness. The inguinal glands were swollen and tender and no sign of inflammatory or infectious processes could be discovered

in the territory which they drained. The axillary glands were large, possibly not having receded after the old mastitis. The cervical glands showed slight enlargement. There was no enlargement of the mediastinal glands and the tonsils had been removed. All symptoms abated gradually within two weeks and recovery was uneventful, though slow. Blood examination three months later showed 70 per cent Hb., erythrocytes 4,440,000, leucocytes 9,200 and differential count—p.m.n. 60.5 per cent, small lymphocytes 14.5 per cent, large lymphocytes, 20.5 per cent, mononuclear 1 per cent, eosinophile 2.5 per cent. No abnormal red cell forms.

Case 2. Single, aged 40. This patient came down with a grippy cold ten days before examination. Temperature and pulse were normal, the heart and lungs negative, B.P. 110/80, abdomen negative. Urinalysis negative except for a slight trace of albumin. The blood hemoglobin was 75 per cent; no other examination made at that time. Four months later had a Vincent's angina and at this time the blood picture was very characteristic, with an enlargement of the axillary and inguinal glands and the spleen easily palpable: Hb. 72 per cent r.b.c. 4,608,000, w.b.c. 16,600, of which p.m.n.s were 23 per cent, l.l. 72 per cent. There were 2 per cent also of so-called basket cells found. This case also returned to normal in about four weeks.

Case 3. A boy of ten. Came in with a subaxillary swelling which proved to be an enlarged non-suppurating gland. He had the mumps one and a half weeks before present onset and when he noticed the above mentioned swelling nothing was found wrong with his teeth or tonsils. He had no fever nor bleeding from the gums. There was a moderate enlargement of the submental, posterior cervical, axillary and inguinal lymph nodes. The spleen was easily palpable. Otherwise, except for hydrocele of the cord, there was nothing noticeably wrong. Urine and stools were normal. Blood examination showed 70 per cent Hb., r.b.c. 4,064,000, w.b.c. 12,100, of which the p.m.n.s were 14 per cent, s.l. 8 per cent, l.l. 71 per cent, eosinophile 1 per cent, basophile 1 per cent and degenerated forms 5 per cent,—a total of 86 per cent of mononuclear cells. Later counts showed a gradual return to a normal differential count with recovery.

It is from the standpoint of the clinician and clinical pathologist that this group is of greatest interest. It is obvious that we have a reaction of the patient, which is unexpected in the light of our former experience, and which strongly suggests the onset of an acute malignant leukemia. Why does not the same blood picture result from infections more commonly? Is it due to a different type of organism, or to some peculiar condition of the tissues of the individual affected? The work of Rosenow in other infectious conditions tempts one to advance the hypothesis of a selective action in this instance upon the lymphogenetic tissues of infectious organisms ordinarily not exhibiting this property. If Rosenow's contentions be accepted, an infectious agent may at one time irritate one set of tissues, and by some change may at another time show an avidity to attack an entirely different

part. It is at least conceivable that we have here an instance of the peculiar selective activity of an infectious agent upon the white blood forming tissues. No blood cultures have been reported as positive, but it is desirable that such investigation be carried out.

TO SUMMARIZE

1. Lymphocytosis, which disappears entirely, strongly suggesting the onset of acute leukemia, occurs following benign infections.

2. The clinical course of the affection alone establishes its true character; it is not to be made out from the early blood examinations.

3. Bacteriologic studies may show that known infectious agents may take on selective properties which result in a reversal of the usual polymorphonuclear leucocyte percentages in the blood, and a lymphocytosis instead.

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To educate public opinion is a painful duty, but it is one that must be faced, and each of the great professions has its allotted task in keeping the public well informed on the subject on which it can speak with authority. We may look forward to the time when many of the diseases which now afflict humanity will have gone the way of typhus, leprosy and cholera; when the average health, strength and beauty of the people will be greatly enhanced, and when those crimes and vices which crop up as if by fatality in certain stocks will be comparatively rare.

Doctors are our modern father confessors. Men and women go to them who formerly went to the clergy. They have earned and they have received the confidence of all who are in trouble about their bodies and of many who are in trouble about their souls. No one can speak too gratefully of the way in which the work is done, of the skill, the kindness, the understanding and sympathy, even the toleration of human weakness on the part of the medical profession. Nevertheless, I put this question: Does the medical profession as a whole take its proper part in guiding and influencing public opinion in these matters wherein it alone can speak with authority.—Extract from sermon by St. Louis Pastor, *Globe-Democrat*.

EXPERIMENTAL RESULTS OF CABLE GRAFTS AND TUBES OF FASCIA LATA IN THE REPAIR OF PERIPHERAL NERVE DEFECTS

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Experiments were conducted for the purpose of ascertaining comparable results in the rapidity and completeness of regeneration obtained by two methods of bridging defects in peripheral nerves, the use of cable grafts and of fascial tube grafts. The results were further compared with those obtained by end-to-end suture for control. In all, twenty-six experiments were conducted: four controls, of end-to-end suture; eleven in which cable grafts were employed; and eleven in which fascial tubulization was used. The length of the gap bridged by the cable grafts and the tubes of fascia lata was the same; the former consisted of autogenous sensory nerves and the latter of autogenous fascia lata.

The operations were performed on dogs under ether anesthesia and sterile technic. The sciatic and musculospiral nerves were used. In the control experiments of resection and suture the nerve was exposed and sectioned with a sharp scalpel and immediately sutured with fine silk. In the experiments with cable grafts the nerve was exposed, 4 cm. resected, and an autogenous cable graft inserted which was made up of several strands of either the superficial radial nerve or the internal cutaneous and, in some cases, both. The size of the graft was never less than three-fourths that of the nerve into which it was inserted. Very fine silk, one-third of a strand of No. 0 Japanese silk on a No. 12 cambric needle, was used. Usually two sutures were placed at each end of each strand in order that funiculi of the graft might accurately approximate those of the nerve into which the graft was inserted (Fig. 1). In fascial tubulization, the method described by Kirk and Lewis was followed (Fig. 2). The smooth side of the fascia lata taken from the same dog was placed within to form the lining of the tube. The bore of the tube was made twice that of the nerve being repaired.

The animals were examined often and the time of disappearance of paralysis, healing of ulcers, atrophy of muscles, and so forth, was noted. Ani-

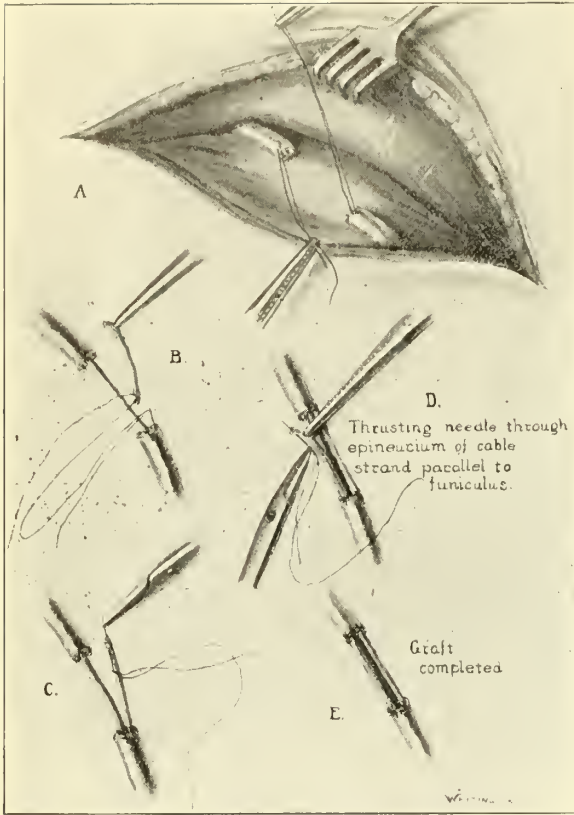


Fig. 1. Cable graft. A. Proximal and distal segments held with guide suture. B. Suturing strand in place. Each end of strand is fastened with two epineurial silk sutures. C. Next stage in inserting strand. D. Fourth strand being sutured in place over the remaining funiculus uncovered in the proximal stump. E. Graft of four strands completed. Combined size graft equal to that of nerve repaired.

mals with infected wounds were discarded; necropsy was made soon after death on those that died from causes not affecting the conditions of the experiment, and those that lived until the termination of the experiment were killed under ether. The animals were etherized, the muscles supplied by the nerve experimented on were exposed by reflecting the skin, and the degree of atrophy, muscle tonus, color, power of voluntary motion, and response to electrical and mechanical stimuli were noted. The nerve proximal and distal to the graft, as well as the graft, was dissected free, the nerve was cut 2.5 to 5 cm. proximal to the graft, and mechanical, galvanic, and faradic stimuli were applied to the cut end of the distal segment. After these examinations had been completed, the animals were killed with ether and the nerves removed for microscopic study. The results of the twenty-six experiments are summarized in the accompanying table.

RESULTS

In the four control experiments, resection and suture, special attention is called to (1) the absence of adhesions around the suture line; (2) the normal appearance of the animals after from four to six months and the healed condition of the ulcers, (3) the absence of muscular atrophy, (4) the normal response to pinching and electrical stimuli applied to the isolated nerve proximal to the suture line, and (5) the normal microscopic picture of the nerve distal to the suture line.

There were eleven experiments in which gaps were bridged with cable grafts. The animals did well but not so well as those in the control experiments with end-to-end suture. The ulcers healed, the paralysis disappeared, and the animals apparently became normal after from eight to ten months. In the seven instances the estimated return of function after 334 days or more was 70 to 85 per cent. Proximal neuromas were present in all cases, but they were smaller than in experiments with fascial tubes. Adhesions to the graft

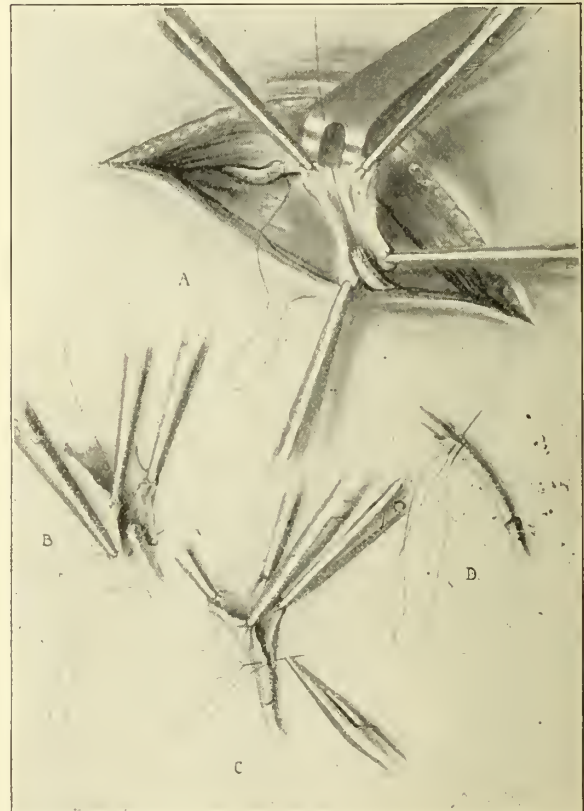


Fig. 2. Technic of nerve suture. A. Fascia lata transplant trimmed and held in defect preparatory to suturing. B. First stitch passes through fascia, through epineurium and again through graft, making a trough. C. Above suture continued along edges of fascial transplant, making a tube. D. Tube completed.

were thin and fewer than in the experiments with fascial tubes. Fibrous tissue in the graft was not seen microscopically; the spaces between the funiculi were filled largely with loose areolar tissue (Fig. 3). Fibrous tissue was not more abundant or more dense in long-standing cases than in recent cases. The fibers grew through the transplanted sensory nerve and into the distal segment (Fig. 4). At first the new funiculi occupied only a part of the transplant (Fig. 5), but later they filled it entirely. The graft had the appearance of a normal peripheral nerve in contrast to the hard fibrous band in the experiments with fascial tubes (Fig. 6).

In the eleven experiments with fascial tubulization, all the animals did poorly; they remained paralyzed, and the ulcers were unhealed at death. In two instances in which the animals lived more than 334 days the estimated return of function was 25 and 10 per cent respectively. Return of function could not be demonstrated in the four instances in which the animals lived more than 215 days. The proximal neuroma was very large in every case (Fig. 7); adhesions to the graft were dense and firm and the graft was separated from the surrounding tissues only with great difficulty. Large amounts of fibrous tissue were seen microscopically along the graft; as much as 75 per cent of the area of a cross section was made up of fibrous tissue in most of the old cases. Fibrous tissue was more abundant and dense and nerve elements proportionally fewer in the earlier experi-



Fig. 4. (Dog D455.) Neuraxes passing from transplant into distal segment of nerve (x 100).

ments. The neuraxes grew down through the fascial tube. Early, the funiculi were abundant and small, but were never so large as those of a normal nerve or of a cable graft. Later they were fewer, and ran between the dense connective tissue (Figs. 8 and 9). The graft had the normal funicular arrangement with neuraxes but in some instances after 215 days or more some of the fibers had undergone wallerian degeneration (Fig. 10).

DISCUSSION

These experiments, conducted with uniform technic under uniform conditions, make possible the comparison of results of the use of cable grafts of autogenous sensory nerve and tubes of fascia lata in bridging defects. The cable grafts yielded earlier and more complete return of function. The experiments with fascial tubes resulted in delayed and less complete regeneration, and return of muscle function was slight. The results corre-

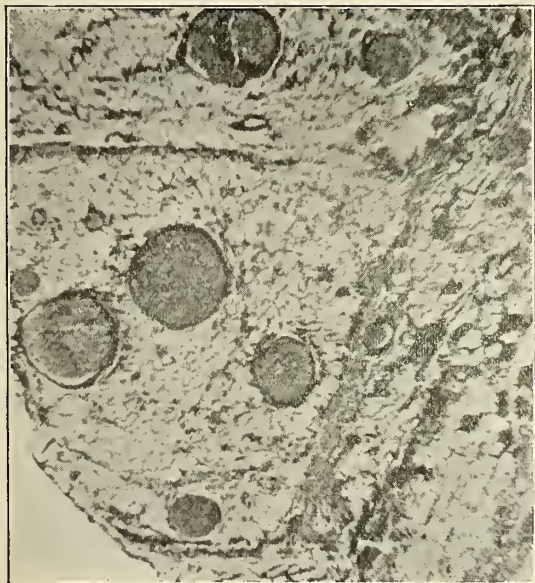


Fig. 3. (Dog D456.) Absence of fibrous tissue in nerve graft around new nerve bundles (x 25).



Fig. 5. (Dog D637.) New funiculi in autogenous graft (x 50).

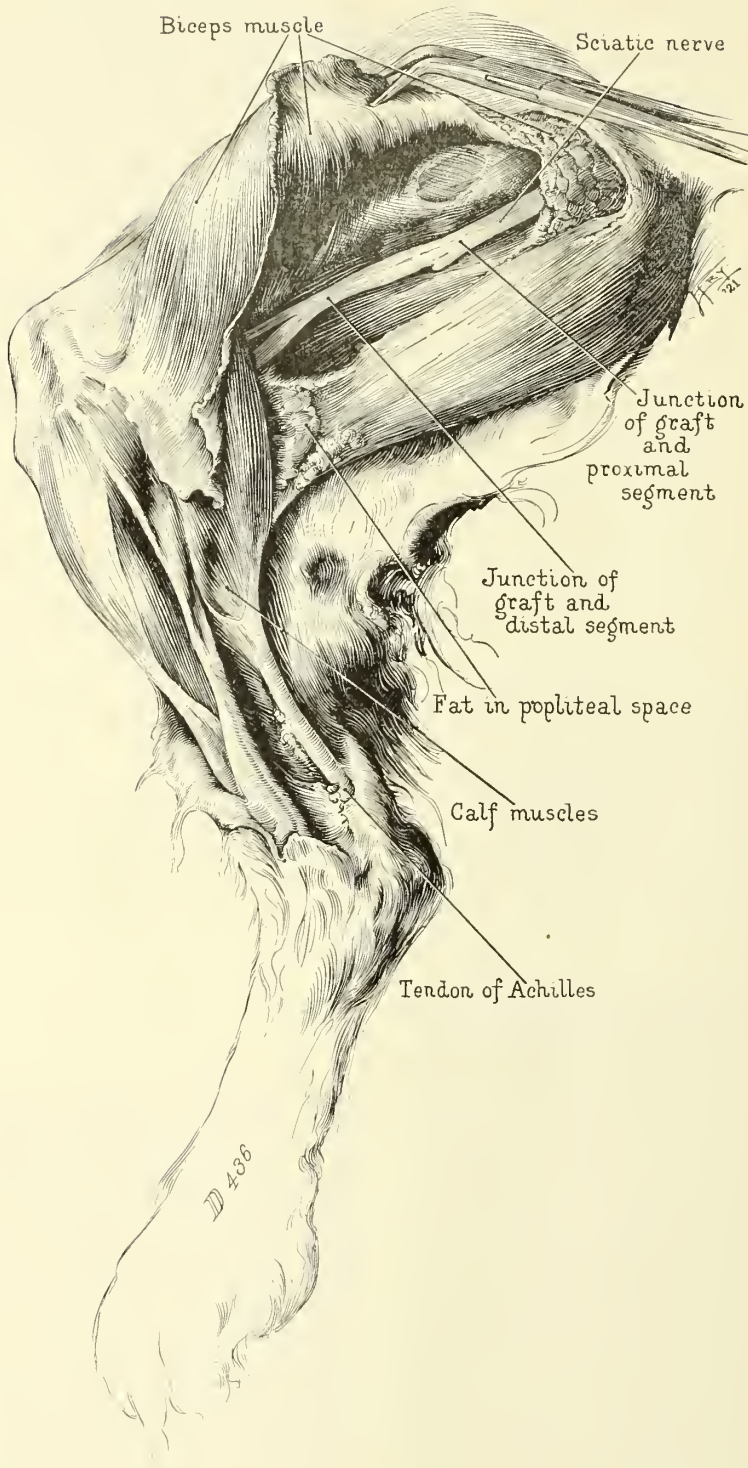


Fig. 6. (Dog D436.) Sciatic nerve with graft a very small neuroma proximally. Note development of anterior tibial and peroneal groups of muscles; 434 days after operation.

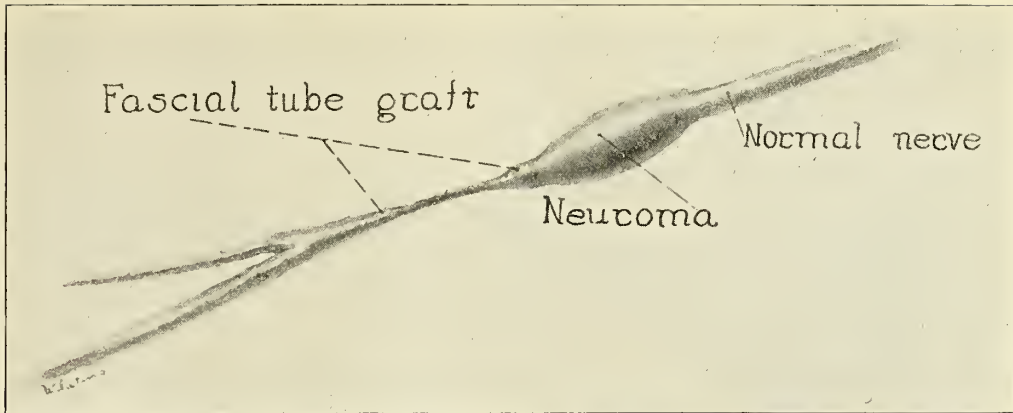


Fig. 7. Result of fascial tube graft. Large proximal neuroma. Remains of fascial tube consists of a fibrous cord.

spond fairly well with those obtained by Huber in a large number of experiments. The discrepancy in the end results as seen in the macroscopic and microscopic appearance of the grafts may be explained by the following:

In the cable grafts the funiculi remain intact and the strands are united by areolar and loose connective tissue which has the same density soon after the experiment as it has a year or more later; in other words, the normal condition of a peripheral nerve is established and maintained. In the experiments on fascial tubulization on the other hand there are abundant neuraxes with many funiculi passing through the tube at the end of two or three months and the neuraxes pass into and down the distal segment in an apparently

normal manner. At this stage the main difference between the two kinds of grafts lies in the small and numerous funiculi surrounded by abundant fibrous connective tissue and the thick fibrous remains of the fascial tube in fascial tubulization. In older experiments the amount and density of the fibrous tissue is found to be increasing and the nerve elements correspondingly decreasing, so that if a tube graft is examined after one year it has the gross appearance of a fibrous cord and microscopically the funiculi are few and small. From the observations of Kirk and Lewis and others, it has been shown that the nerve regenerates through the fascial tube; protoplasmic bands form and the neuraxes pass through these to penetrate the distal segment. Funiculi are formed in the graft, each

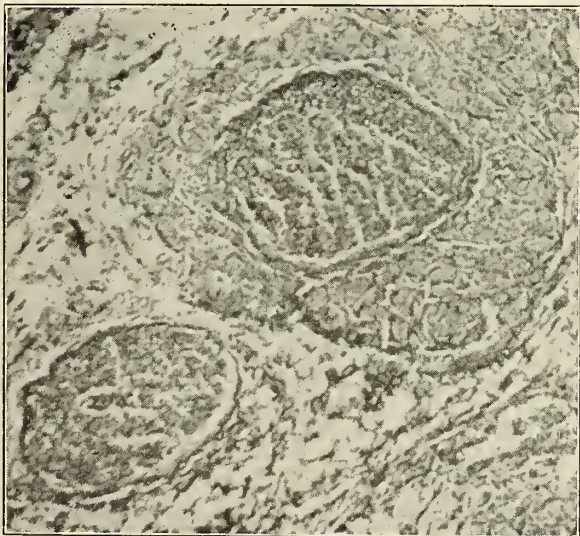


Fig. 8. (Dog C872.) Early fascial tube graft with numerous small funiculi containing neuraxes (x 50).

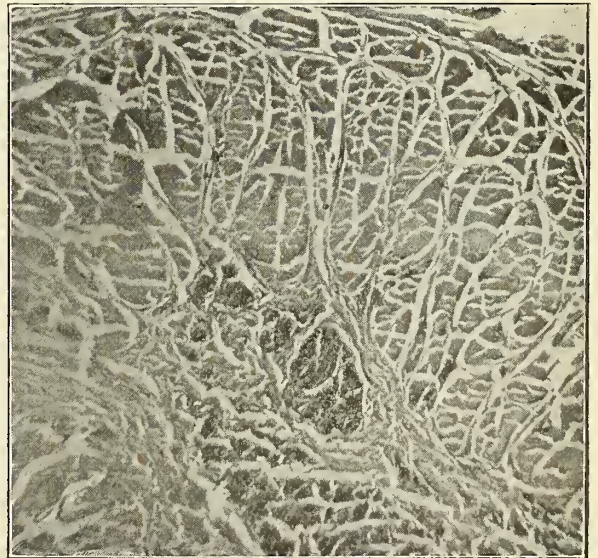


Fig. 9. (Dog C584.) Fascial tube graft 239 days after operation showing dense fibrous tissue strangulating bundles of nerves (x 50).

Table 1
EXPERIMENTAL FINDINGS
END TO END SUTURE

Dog	Nerve	Signs of regeneration, months	Ulcers healed, months	Operation to death, days	Cause of death	Atrophy of muscles, degree	Size of proximal neuroma, times	Adhesions, degree	Pinching	Paradism	Galvanism	Fibrous tissue, degree	Neuraxes	Funiculi	Microscopic Sections Proximal Distal	Partial proximal degeneration 100 100 Regeneration progressing rapidly	Estimated return of function, per cent
D437	Sciatic	Paralyzed	Not healed	5	Pneumonia	0	+1										
D436	Musculo-spiral	6	4	434	Killed with ether	+1	1.5	+1	+	+	+						
D436	Sciatic	6	4	434	Killed with ether	0	1.25	+1	+	+	+						
D890	Sciatic	Paralyzed		44	Killed with ether	?	?	+1									
CABLE GRAFTS																	
D455	Musculo-spiral	7	6	334	Killed with ether	+1	1.1	+1	+	+	+	0	Normal	Normal in number and arrangement	Neuraxes normal		85
D455	Sciatic	9	10	419	Killed with ether	+1	1.2	+1	+	+	+	0	Normal	Normal in number and arrangement	Neuraxes normal		85
D456	Musculo-spiral	8	9	351	Killed with ether	+1	1.5	+1	+	+	+	0	Normal	Normal in number and arrangement	Neuraxes normal		85
D456	Sciatic	10	10	405	Killed with ether	+1	1.5	+1	+	+	+	0	Normal	Normal in number and arrangement	Neuraxes normal		80
C830	Sciatic	Foot off at ankle	?	380	Killed with ether	+2	2.0	+1	+	+	+	+1	Normal	Normal in number and arrangement	Neuraxes normal		80
C887	Sciatic	Paralyzed		32	?		?	+2				0		Normal in number, small	Neuraxes few; partial wallerian degeneration		
D637	Sciatic	Paralyzed	Not healed	29	Killed with ether		1.5	+2				0	Normal	Large and normal	No neuraxes, complete wallerian degeneration		
D679	Musculo-spiral	9	9	279	Killed with ether	+2	1.25	+1	No response	+	+	+2	Numerous	Small and numerous	Neuraxes normal		25
D714	Sciatic	Foot off at ankle		339	Killed with ether	+1	1.5	+2	+	+	+	0	Normal	Large and normal	Neuraxes normal		75
D722	Sciatic	6 to 10	6 to 10	392	Killed with ether	+1	2.0	+1	+	+	+	0	Normal	Large and normal	Neuraxes normal		70 to 80
E169	Sciatic	Paralyzed	Not healed	105	Unknown		2.0	+2				0	Normal	Normal	Neuraxes normal; no degeneration		

FASCIAL TUBULIZATION

C834	Musculo-spiral	11	5	387	Killed with ether	+2	3.0	+4	+	+	+4	Small and few, surrounded by dense fibrous tissue	Neuraxes few; partial wallerian degeneration	25
C887	Musculo-spiral	Paralyzed	Not healed	19	Pneumonia	?	?	+3			+1	Many and small, surrounded by leukocytes, sheath cells and débris	Occasional neuraxis; wallerian degeneration	
C872	Musculo-spiral	Paralyzed	?	49	Pneumonia	1.5	+3				+2	Small; many inside fascial tube	Neuraxes 50 per cent of normal; partial wallerian degeneration	
D584	Musculo-spiral	Paralyzed	4	215	Accidentally killed in fight	+3	1.5	+4			+4	Small and numerous, containing normal fibers	Neuraxes normal	
D584	Sciatic	Paralyzed	Not healed	239	Accidentally killed in fight	+3	1.5	+4			+4	Small and few, surrounded by dense fibrous tissue	Neuraxes 20 per cent of normal; partial wallerian degeneration	
C819	Sciatic	Paralyzed	Not healed	335	Arthritis	+3	2.0	+4			+4	Small and few, passed through dense scar tissue	Neuraxes 10 per cent of normal; partial wallerian degeneration	10?
D607	Sciatic	Paralyzed	Not healed	58	Killed with ether		2.0	+4			+1	Small and few, surrounded by erythrocytes, leukocytes, and débris, sheath cells	Occasional neuraxis; practically all fibers in state of degeneration	
D608	Sciatic	Paralyzed	Not healed	228	Pneumonia	+3	2.0	+4			+3	One, small, surrounded by dense fibrous tissue	Neuraxes, large number	?
D679	Sciatic	Paralyzed	Not healed	285	Killed with ether	+3	2.0	+4	-4	-4	+3	Few, small, surrounded by dense fibrous tissue	Neuraxes, probably 60 per cent of normal; few fibers in state of degeneration	
E156	Sciatic	Paralyzed	?	198	Killed with ether	+2	2.0	+4	+1?	+1?	+4	Small, containing neuraxes	Neuraxes few; partial wallerian degeneration	?
E188	Sciatic	Paralyzed	?	195	Killed with ether	+3	3.0	+4	+1?	+1?	+4	Numerous, small	Neuraxes few; partial wallerian degeneration	?

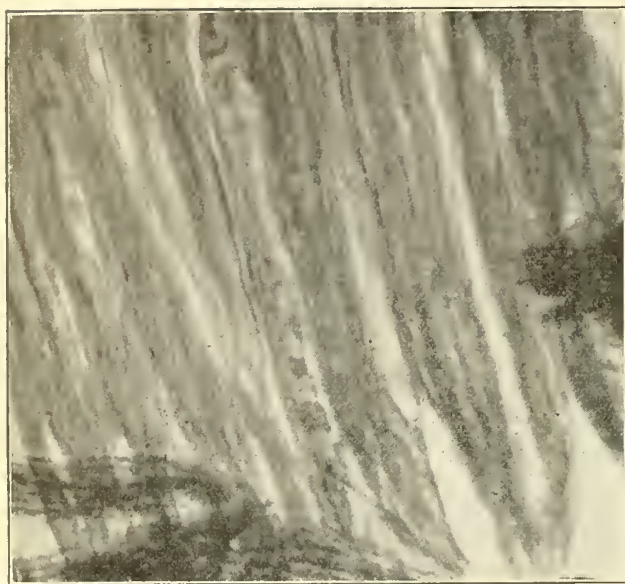


Fig. 10. (Dog D584.) Longitudinal section fascial tube graft 215 days after operation showing degenerating fibers (x 140).

surrounded by a perineurium. From my experiments it appears that at a later stage the fibrous tissue, which has proliferated inside the fascial tube, and the fascial transplant contract and strangulate the inclosed nerve fibers, thus preventing complete return of function in the nerve.

I am aware that cable and tube grafts have given poor results clinically. A plausible reason for the failure of fascial tubulization has been shown by these experiments and the same process may prevent return of function when cable grafts are used. If the graft is placed in a bed of scar tissue, as is so often the case, compression from contraction of the surrounding scar tissue may prevent functional return.

CONCLUSIONS

Experimentally, autogenous cable grafts over a gap of 4 cm. result in satisfactory return of function; they require somewhat longer time than end-to-end sutures, and the return of function is not so complete.

Tubes of autogenous fascia lata used to bridge gaps of 4 cm. result in delayed and incomplete return of function, if any at all. In most cases no return of function results.

Regeneration takes place through the fascial tubes. At first the nerve elements are abundant, but later they are largely replaced by fibrous tissue.

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THE TREATMENT OF CANCER OF THE BREAST*

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The modern treatment of cancer of the breast was introduced in 1867 by Moore when he contended that recurrences are not due to blood infection but to incomplete extirpation of the tumor. He recommended a general removal of the breast, skin, fat, axillary nodes and the pectoral muscles. Since his day various operations have been devised, all based on the fact that the female breast has a complex lymphatic system and that it is essential not only to remove all the mammary tissue but also the aponeuroses of the underlying muscles that harbor the lymph channels through which metastasis chiefly takes place.

It is of interest to note that in frank cases of cancer, the more radical the operation, the less liable is recurrence to occur. This, of course, only applies to those cases which are operable, for the fact must not be lost sight of that many cases do not fall into a physician's hands till all hopes of cure by surgical treatment have passed. Prim-

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rose estimates that 32 per cent of the cases presenting themselves after an average duration of 14 months are inoperable, and Deaver places the figure at 25 per cent. Hence it is apparent that breast tumors, from the standpoint of rational therapy, may be classified as operable and inoperable cases.

According to Handley the condition is inoperable when there is extensive ulceration of the skin, when there are nodules adherent to the chest wall, when the axillary lymph nodes are fixed, when there is edema of the arm, when the supra-clavicular lymph glands are enlarged, when there are signs of distant metastasis or a general carcinosis. In broad terms, then, at least one-fourth of the cases coming for medical advice are inoperable, while approximately three-fourths may be tabulated as operable.

Of the three-fourths that are operable the character and extent of the resection will depend entirely upon conditions as revealed at the time of operation. If a given tumor is of questionable malignancy, or there is a possibility that the lesion may be a pre-cancerous affection, the useless sacrifice of tissue is unwarranted. On the other hand, since gross appearances are often deceiving and procrastination is dangerous, the services of a competent microscopist to make an examination of frozen sections at the time of operation are essential. If the tumor is malignant, then an immediate decision as to how radical an operation is indicated, can be made. The importance of being over-radical in operating rather than painfully conservative is readily proved by statistics. This fact is shown by De Page's report of cases well after three years in different periods. It is as follows: from 1865 to 1875, 9.4 per cent; 1875 to 1885, 10 per cent; 1885 to 1895, 33.8 per cent; 1895 to 1905, 46.5 per cent. It was during this period from 1865 till the beginning of the present century that the great danger of recurrences following inadequate breast operations came to be fully recognized, and that a surgical technic was evolved to reduce the very high percentage of recurrences which attended resections until the late eighties.

However, even with the best of surgery, the ultimate history of breast malignancies is anything but encouraging from the standpoint of a permanent cure. This is well illustrated by LeDentu's table, which shows 47.45 per cent of operated cases well after four years, but only 6.77 per cent known to survive after 19 years. In short, even in the best

of hands 52.55 per cent of operated cases recurred within a period of four years.

When one considers that recurrent cases are seldom, if ever, amenable to further surgical interference, since statistics favor the conclusion that operation on the whole shortens life in recurrent cases, and when one recalls that at least one-fourth of all cancers of the breast are inoperable when they are brought to the physician's attention, the limitations of surgery as a cure for this scourge of womankind can be fully appreciated.

The question, therefore, arises: Is there not some other form of therapy which may be used to supplement surgery to cure cancer of the breast, or at least to minimize the danger of early recurrence? This question is best answered by calling attention to the applicability of radiant energy as an adjuvant to surgery in the treatment of malignancy.

The consideration of this question, insofar as it refers to cancer of the breast, may conveniently be divided under three headings as follows: (1) the indications for x-ray therapy as a pre-operative measure; (2) as a post-operative measure; (3) as a palliative in recurrent and inoperable cases. Attention is again called to the fact that Primrose regards 32 per cent of breast tumors as inoperable, and Deaver 25 per cent. Here is a difference of 7 per cent, which may be tabulated as border line cases and in which operation is of questionable advisability. These are cases in which the axillary lymph nodes are enlarged and not freely movable.

At the Massachusetts General Hospital, Greenough reports that of 236 cases with palpable axillary nodes only 12 per cent were cured by operation, while of 275 similar cases Finsterer reports only 4.3 per cent as cured. Ewing is of the opinion that the last figure represents the average success obtained by surgical treatment, which means that, when a woman presents an established mammary cancer with axillary nodes palpably affected and firmly fixed, she has about one chance in 25 of being cured by operation.

It is this type of case in which I believe pre-operative x-ray treatment is indicated. If an intensive x-ray irradiation in massive dosage is administered in accordance with the technic now employed, the following results are to be expected: there will be a marked recession in the glandular enlargement; the cancer cells if not killed become encapsulated and their malignancy reduced; many

of the smaller lymphatic channels will be obliterated and the tendency to rapid metastasis thereby greatly inhibited. These are all desirable accomplishments, as it is a well known fact that operation causes rapid and widespread metastasis in a high percentage of these cases by opening up the lymph channels and frequently by auto-plastic transplantation. If a period of three to four weeks is allowed to elapse between the time of irradiation and operation to permit a maximum amount of peri-lymphatic fibrosis to form, then operation can be made with a minimum risk.

Boggs advocates that the operation be limited to the removal of the primary tumor and believes that the axilla should not be disturbed on account of its richness in lymph channels, which, when opened, increase the danger of a rapid extension of the disease. He thinks that with the primary tumor excised, the lymphatic involvement can best be controlled by radio-therapy, and that much better results will follow than if the axillary metastatic mass is removed surgically.

This is a point, however, which must finally be settled after a large number of these cases have been treated by our present method of massive dosage through thick filters and at high voltages, and reliable statistics of the results obtained have been compiled. It is my personal conviction, however, that this form of therapy will improve cancer statistics if the x-ray irradiations are administered in lethal dosage.

I have already referred to the fact that statistics show that at least 52.55 per cent of operated cases recur within a period of four years. Could there be any stronger argument than this for the use of any method of therapy as an adjuvant to surgery that promises to prevent or even retard this high percentage of recurrences? I believe, therefore, that each and every case of operated breast tumor in which the clinical diagnosis of cancer is confirmed by the microscopist's report should receive post-operative x-ray treatment. If this therapy is given intelligently by a trained radio-therapist, certain definite results can be achieved. These may be summarized briefly as follows: any deep-seated cancer cells which have escaped removal with the scalpel can be killed outright or at least so modified in their life cycle as to cause their becoming encysted. The scar, which is frequently extensive and exceedingly painful on account of tissue retraction and which is often decidedly keloid in char-

acter, is rendered soft and pliable and entirely painless. This is an exceedingly desirable end result since recurrence along the margin of the skin incision is common. So aside from the destructive and prophylactic action of x-rays on post-operative, residual cancer cells, their administration speeds up convalescence and causes the more prompt return of functional activity.

In the treatment of post-operative recurrences and inoperable cases of mammary carcinoma, the radio-therapist during the last few years has been given ever-increasing freedom of action. To his credit it can be said that ample statistical proof is available that no other known therapy can even approximate the usefulness of radio-active energy in the treatment of terminal cases of cancer. Many patients come seeking relief from pressure symptoms caused by metastatic masses and from extensive foul-smelling, painful ulcers. These annoying, depressing and loathsome symptoms quickly can be brought under control and in an encouraging percentage of cases the sloughing ulcer can be entirely healed. Some seemingly hopeless cases are on record, in which the lives of patients have been prolonged for eight and ten years, and during this time they remained clinically healthy, leading comfortable and economically useful lives.

To sum up the subject in the light of our present knowledge, the operative field has apparently reached its limit. For this reason hope for a further reduction in the mortality from mammary carcinoma appears to depend upon the outcome of two methods of attack: first, educational; second, radio-therapeutic.

By a well worked out publicity campaign which should be under the control of the profession and probably entrusted to public health workers, the laity should be educated in reference to the initial signs of cancer and its causes insofar as known, and counseled to seek medical advice early. This should result in the detection and eradication of precancerous conditions and in the diagnosis of actual malignancy at a time when it can be removed en masse.

In conclusion it may be stated with considerable confidence that the routine post-operative treatment of all early cases of mammary cancer with x-rays and the pre-operative as well as post-operative irradiation of all cases of questionable operability promise materially to increase the percentage of permanent cures.

THE THYROID IN INFANCY*

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The thyroid gland is of vital importance in the physical and mental development of the growing infant, and consequently disturbances of this gland will produce a greater effect in infancy than in adult life.

The disturbances of the thyroid in children are congestion and inflammation of the thyroid, which are usually metastatic in character, and especially observed in the course of acute infectious diseases, differing in no way from the course as found in adults. Goiter is also often found in children. It comes in various periods, occasionally being congenital and increasing in frequency between the ages of eight and fifteen years. The cause of these goiters is very little different from that of adult life, except that there is a more rapid tendency to enlargement secondary to chronic septic foci.

Exophthalmic goiter is rarely found in childhood, but when found does not differ in its course and treatment from that of adult life. Especially interesting is that form of goiter found in adolescence which usually runs a short course and is rapidly amenable to iodine treatment. Of interest is the work done by Marine on the prevention of this form of goiter by the prophylactic administration of iodine.

Of special interest in pediatric work are the conditions produced by the partial or complete absence of the thyroid, which cases come under the group name of myxedema or cretinism.

The diagnosis of myxedema is made early or late, depending upon three factors: (1) the degree of hypothyroidism; (2) whether the patient is breast-fed or bottle-fed; (3) the diagnostic ability of the observer.

The earliest that the diagnosis can be made in myxedema is at three weeks in a bottle-fed baby and three months in a breast-fed baby.

These patients show the following characteristics: in general they resemble a cave-man in type; the head is normal in size or slightly larger than normal, plump, round, situated on a short, thick neck; the fontanelles remain open for a long time; the forehead is low and horizontal; the root of the nose

is broad and sunken; the eyelids and lips are thick and edematous; the tongue is large and swollen, hence it protrudes from the mouth, which is usually open; the teeth are slow in coming, and decay early; the abdomen is pendulous and marked by a large umbilical hernia; the extremities are more or less tubular, being spindle-shaped or columnar in type, and the articulations are thickened; the hands and feet are short and flabby, with short, fat fingers—the so-called spade hand.

Cretins walk late, and the gait is awkward and draggy. The skin is pale, dry, waxy and doughy in consistence. The hair is spare and brittle. The body temperature is generally subnormal. There is no perspiration whatever, even in the hottest summer; consequently the skin feels dry, flabby and cool, and easily desquamates, especially on the cheeks, and wrinkles will often form at certain parts of the body, notably at the hands and feet, such as are normally only observed in most advanced age.

Metabolism is considerably and constantly impaired, showing only 50 to 60 per cent of healthy values. As a matter of course sexual development never occurs, and entirely corresponds with the general condition. Even in adult age the patient shows complete infantilism.

The mucous membranes participate in the myxedematous change, as shown by the tongue, the molar mucosa and the rough voice. The mucous membranes of the oral cavity and tongue are thickened, the latter being exceedingly large from the abundance of myxedematous connective tissue between the muscular bundles. The tonsils are hypotrophic, the gums narrow. The tongue protrudes from unshapely lips, the respiration is grunting and snorting, and the voice rough, unpleasant and inarticulate.

The blood-forming organs function badly. There is great pallor, and the complexion is usually of a sallow hue. The hemoglobin content is low, there are numerous forms of erythrocytes of varying ages, and the polynuclear leucocytes are increased.

Fatty tumors are present in the supraclavicular and axillary spaces.

The intelligence varies from that of a child a few years younger to that a little above an animal. The expression of the face is that of a man with the cares of the world upon his shoulders. The voice is husky, and due to their timidity they rarely speak.

Their musculature is weak in general; conse-

*Presented before St. Paul Clinic Week, Jan., 1922.



FIG. 1



FIG. 2

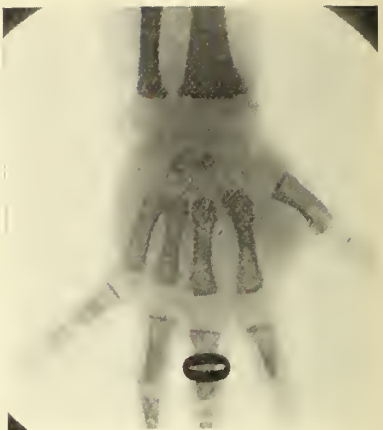


FIG. 3

quently they are constipated, and stand and walk late.

The bony changes are most important from a diagnostic point of view, and show delayed ossification and diminished growth of the long bones. In fact, they represent the normal condition of a child a few years younger.

The mongolian idiot is most often confused with the cretin, making the differential diagnosis important.

The mental state of the mongolian is entirely different. Instead of being sad and depressed, he is happy, vivacious, and a great mimic, continually getting into mischief, while the cretin is timid,

quiet and sad. Often the mother mistakes the mongolian for a bright child, but on questioning you will find that he is hard to train and to make obey. The head of a mongol is brachio-cephalic instead of round like a cretin. The mongol's face is flat, the hair long and stiff instead of spare and brittle like a cretin. The eyes of a mongol have the characteristic Mongolian slant, while the eyes of a cretin are horizontal, even if puffy and narrow. Over-development of the epicanthic folds (the third eyelid) of the eyes are typical of the mongolian idiot. The bridge of the nose is flat in a mongolian idiot. The nose is so small it looks like a button, and the nostrils point forward.



FIG. 4



FIG. 5

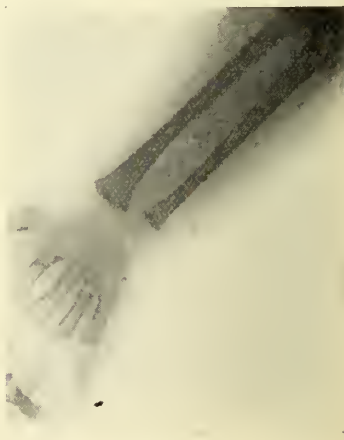


FIG. 6



FIG. 7

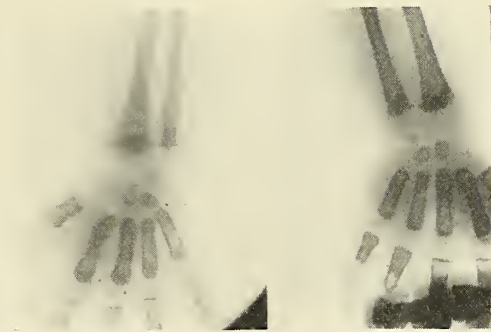


FIG. 8

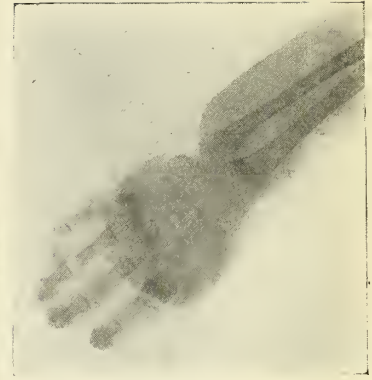


FIG. 9

In a mongolian the mouth is open as in a cretin, and the tongue often protrudes, but this is not due to a large tongue as in a cretin, but to lack of intelligence.

Blepharitis is common in mongols, and rare in cretins. Also, mongols often have fine radio-fissures in the mucous membranes of the lips. The skin in mongols is entirely different from that in the cretin; it is not doughy, pale and dry, but nearly normal. Especially is this noticeable in the face, where, in contrast to the cretin, the mongol shows considerable color, having a dab of red in each cheek and a dab of red in the chin, like an actress prepared to go on the stage, while the face of the cretin is pale, dry and pasty.

Hypermotility of all the joints is a diagnostic point of value in mongolian idiocy. The limbs of these patients can often be twisted like those of a

rag doll. A most important point in differential diagnosis is to be gained by determining the proportion of the length of the limbs to that of the entire body, which is diminished in a cretin, but not in a Mongolian idiot. The mongolian hand has a characteristic short, curved little finger.

Although typical cases of cretinism can easily be recognized, still we often have difficulty in diagnosing atypical and partial myxedema. Occasionally in spite of these differential diagnostic points we encounter considerable difficulty in differentiating atypical cases of mongolian idiocy from myxedema. The x-ray findings offer at present a very simple, easy and accurate means of diagnosing typical and atypical cases of cretinism and of mongolian idiocy, and I shall explain x-ray findings in these conditions, and show a few plates of each condition, as in these difficult diagnostic borderline



FIG. 10



FIG. 11



FIG. 12

cases one glance at an x-ray picture will conclusively settle the diagnosis.

In cretinism we have two x-ray changes: (1) shortening of all the long bones; (2) delayed appearance of the centers of ossification. In mongolian idiocy we have no delay in the appearance of the centers of ossification; in fact, in my experience, they sometimes occur before the normal. Besides this, we have a point of great value in x-ray findings of the little finger in a mongolian, where we find present a tendency to curving of the little finger, with considerable shortening of the middle phalanx. In fact, so small may this middle phalanx be that it may represent a cube or marble.

Fig. 1. The normal hand, showing the centers of ossification as they occur from infancy to childhood.

Fig. 2. A normal hand at three years of age, showing the state of development at that age.

Fig. 3. A child six years seven months, who was brought to me because of underweight. This child had the figure and height of about a three-year-old child. The father said to me: "Everybody says how cute my child is, but they don't realize that he is six years seven months old." On looking at this x-ray picture you will see that he has the x-ray findings of a child only two years old, making the diagnosis of cretinism positive.

Fig. 4. The same patient as Fig. 3 after three years of thyroid treatment. Note the rapid improvement in the bony structure, which also corresponds with the physical improvement.

Fig. 5. A child seven months old who was brought in because the child was mentally backward—did not grasp objects or attempt to sit up. I was told that the child was a cretin. On observing the x-ray picture you will see there is no delay in the centers of ossification, and also see nicely the mongolian little finger.

Fig. 6. Child 22 months old, brought to me because the child was underweight. A little constipated, otherwise child did not show marked deviation from normal except his fingers were slightly short. X-ray picture shows clearly the complete absence of ossification in the wrist. In other words, his wrist is that of a child five months old.

Fig. 7. Same child a few years later, showing the result of thyroid treatment.

Fig. 8. An interesting picture of a child 18 months old, brought for backwardness, both physical and mental. X-ray shows normal centers of ossification and the mongolian finger. Also shows definite syphilitic changes in the lower end of the radius and ulna, showing this to be a combination of syphilis and mongolian idiocy.

Fig. 9. Child brought to the clinic, aged one and one-half years. This child had the weight of a child of five months; showed no desire to sit up, or even grasp objects. X-ray picture shows clearly the complete absence of centers of ossification in the wrist, indicating clearly that it is a case of hypothyroidism; the rachitic changes in the bones are also seen. Diagnosis: Cretinism and rickets.

Fig. 10. Child six years old, considerably under weight, pale, pot-bellied, large head, constipated—being treated

for a long time for rickets, with only slight improvement. X-ray shows unmistakably that centers of ossification are those of a child only six months old.

Fig. 11. Under thyroid treatment the child (Fig. 10) made wonderful improvement, and in two years this is the result.

Fig. 12. Child two and one-half years old, not walking, constipated, hard to manage, below normal in size. X-ray picture shows clearly centers of ossification to be normal or above normal, showing also clearly the characteristic little finger of the mongol.

THE EARLY SYMPTOMS OF ACUTE POLIOMYELITIS*

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The committee on clinical research of this association, desiring to stimulate keener clinical observation and the keeping of more careful case records, decided to make a survey of the early symptoms of acute poliomyelitis.

A questionnaire was made embodying, first, the observations of the parents of the first signs of illness as told the physician, then the clinical findings as given by the physician himself. A few questions were asked in regard to treatment and results. One of these questionnaires was sent to each of the five hundred members of this association and also to each of the two hundred and fifty physicians who had reported cases of poliomyelitis to the State Board last year.

Out of the 750 sent out 169 replied; 27 of the number were doing special work that did not bring them in contact with this disease; 45 reported that they had had no recent cases or that their records were so incomplete that they could not use them to any advantage.

Two things are a matter of regret, namely, that so many physicians showed so little interest in this project that they did not reply, and many of the questionnaires returned were so incomplete that they were of little value. This result would indicate that the average physician does not make a thorough physical examination and get a careful and complete history, or if he does he does not keep satisfactory case records. The latter may, in many cases, be due to lack of time.

It was under this handicap that the writer attempted to correlate the following material gath-

*Presented before the Southern Minnesota Medical Association, Rochester, Minn., June 19, 1922.

ered from the reports of the 97 physicians, reporting about 150 cases.

There were more males affected than females. The youngest case reported was five months and the oldest thirty-three years; the majority were under eight years. The mental condition is shown by 23 per cent being irritable, 55 per cent restless, 42 per cent drowsy, one having insomnia. Fever was moderate in a large majority of cases while it was almost normal in some, and 7 per cent were 104 degrees or over. Intestinal disturbances were shown in 49 per cent by vomiting, 15 per cent by diarrhea, and 42 per cent by constipation in some cases very marked and persistent. Four per cent simulated appendicitis and 9 per cent had abdominal cramps. Pain in the form of headache was present in large majority of cases; 48 per cent had pain in the neck and 38 per cent had backache; 39 per cent had general muscular tenderness. Tremors were present in 14 per cent, twitching in 17 per cent and retraction of the head was noticed in slightly less than half the cases in which the symptom was reported. A positive Kernig was present in thirty-five cases and absent in sixteen; a positive Babinski in twenty-one and absent in nineteen; a positive Brudinski in eight and absent in twenty-one; and a positive Gordon in five and absent in sixteen.

The eye symptoms were varied, showing pupils dilated in 33 per cent, contracted in 4 per cent, while 24 per cent were normal. Only two showed strabismus; twenty-seven reacted to light normally; none reported nystagmus. Respiratory symptoms were present in fifty-nine and absent in twelve.

As to the source of infection one was bitten on the lip by an insect while in a town where poliomyelitis was epidemic. Several had slight trauma and several had unusual physical exhaustion before contracting the disease. One case was reported where the mother took the children to the funeral of an uncle who died of poliomyelitis and ten days later two children developed it.

Twenty-seven per cent had definite sore throat. The frequency of sore throat confirmed the writer's opinion of the tonsils playing an important part in this infection. With this in mind a second survey was taken. Nine per cent of the cases had had tonsillectomies, 10 per cent of the physicians were in doubt as to the part played by the tonsils, 15 per cent were positive that they had nothing to do with it, while 54 per cent stated that they be-

lieved that there was a relationship between the tonsils and the immunity to the disease.

This verifies Dr. Rosenow's theory that the throat and nose play an important part in this disease as the chief port of entry of the infection.

There seems to be no question but that there are abortive cases or, in other words, infection that does not produce any paralysis but only a slight muscular weakness which passes off in a short time and could not be diagnosed even by a careful diagnostician if he were not on his guard and watching for cases of this kind, because of the existence of other poliomyelitis cases.

In the epidemic last year there were a large number of cases that showed meningeal involvement. These cases have, as a rule, headache, vomiting, general pain, rigidity of the neck, more or less opisthotonos, and a positive Kernig or Babinski reaction. Twitching is frequently present.

Spinal puncture should be made upon all suspected cases, for diagnostic purposes, as well as for the relief of pressure; and it gives opportunity to inject serum around the spinal cord. Spinal fluid should be replaced with serum in slightly less amount. The above procedure seems to meet with almost universal success.

At the present time the writer has an interesting case that comes under this last mentioned type.

Irene A., aged 2½ years, strong, robust, never had any previous illness.

May 31st she stepped on a piece of glass, cut her foot slightly and cried nearly all night.

June 1st, she ate strawberries and beans at noon, vomited at 3:00 P.M. and complained of earache.

June 2nd, she played until 4:00 P.M., when she cried and wanted to be carried. She was put to bed and slept till supper time, refused supper, and was restless all night.

June 3rd, she had headache and sore throat, was constipated, and her temperature was 104. The child was brought to my office in the afternoon and the mother told me a day or two later that the child had tremors in the arms in the morning but not in the afternoon.

June 4th, the bowels were open but the temperature was 103.5 degrees in spite of bathing and phenacetin gr. 1 every two hours. She complained of very severe headache, was very restless, crying and at times was delirious and did not know her mother. The leg and back muscles were very tender. The head was slightly retracted and she could be raised to a sitting posture by placing the hand back of the head. A positive Kernig was present. The knee reflex was lost and the Babinski, Brudinski and

Gordon reactions were negative. As there was no serum in town none was used.

June 5th, the tenderness and stiffness now involves the as well as the legs, and the back and neck were very rigid. Headache and difficulty in swallowing were complained of. Mother said her daughter had dark red spots the size of a twenty-five cent piece on her legs and buttocks and the arm that lasted three hours. These were not present when she was examined by the writer. She had a strange "wild cry." Spinal puncture obtained 15 c.c. of clear fluid under much pressure.

June 6th, general condition improved, temperature 102, right forearm and hand paralyzed but not completely, some headache, tenderness less. Condition so improved that spinal puncture was not thought indicated.

June 7th. More headache and restlessness, slightly more fever. Twenty-five c.c. of spinal fluid were withdrawn and 20 c.c. of serum injected.

June 8th. General improvement. she used arm better. Spinal fluid has been sent to state board but no report received as yet.

After a careful study of all of the cases reported, one is impressed with the fact that it is absolutely impossible to make a set of classical symptoms for this disease. However, the occurrence of sudden illness in a child between May and late fall, especially in dry weather, which is characterized by moderate or high temperature, headache, vomiting, restlessness, stiffness of back or neck, especially if there is tenderness of the muscles of the body in general or any special group, should place the physician on the alert for poliomyelitis. The finding of a positive Kernig sign and the loss of the knee jerk should be followed by spinal puncture; should paralysis supervene it will be in groups rather than in individual muscles and they will retain their sensation.

Since starting this paper an article has appeared in the Journal of the A. M. A. by Dr. Lovett of Boston, which covers this subject in a masterly manner. I will close by quoting his conclusion. "The important points are that the diagnosis must not be made on the history but on the physical examination; that tenderness is a guide of great importance in diagnosis, prognosis and treatment; that early treatment consists of rest, and that in the convalescent phase, muscle fatigue is one chief danger and muscle re-education one chief reliance and that deformities prevent proper functions and promote muscular deterioration. If these points are borne in mind, many patients can be spared much unnecessary deformity and disability and we shall be able to take a much more hopeful view of the outcome of poliomyelitis.

ABORTIONS AND CURETTEMENTS*

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Curettement as an operation is vanishing from the lists of many of our best manned hospitals. The present consideration does not concern itself with diagnostic curettement for suspicious malignancy, a procedure well founded where the evidence points to invasion of the uterine body. In like manner, curettement for persistent bleeding, supposedly from fibrous or fibroid uteri, has a useful field, although x-ray and radium are fast limiting this indication for active scraping of the inside of the uterus.

Therefore, a hospital that shows an unusual percentage of curettements probably has on its medical staff men who invade the uterus *early* in conditions associated with pregnancy. It will be the purpose of this paper to attempt to show how seldom curettement is necessary after various types of abortion, and also to present certain statistical data from the records of St. Mary's Hospital, Duluth.

THE MATERIAL STUDIED

Eighty-seven hospital records of patients treated during 1921 were canvassed.

Seven women who came in with bleeding and threatened abortion went on to full term, leaving a series of eighty who did abort. These same women gave a record of having had three hundred and seventy-one pregnancies at full term. This shows us an incidence of abortions to full term of 1 to 4.6. During the same period there were five hundred and fifty-five cases of confinement in the hospital, which gives a general incidence of abortion to full term confinement of 1 to 6.8. From the data of authors consulted on this subject, this seems much lower than the rate usually given.

It is noteworthy that the histories are particularly defective in not pointing out clearly the causes of the abortions. No doubt at times this is a very difficult piece of information to get; many women positively refuse to yield up the facts.

While most of the cases were entered on the records as having occurred from one to three months after the beginning of gestation, there were many records in which no data was given. The time of gestation was given as two months in

*From the Department of Gynecology and Obstetrics—The Duluth Clinic. Presented before the St. Louis County Medical Society, Duluth, Minn., Feb. 9, 1922.

twenty-eight cases; three months in fifteen cases; three and one-half to six months in nineteen cases; the time not given or estimated in twenty-five cases. A careful perusal of the records in this later group of twenty-five cases would strongly suggest pregnancy was either very early, or one might doubt whether it was present at all.

THE GENERAL TREATMENT FOLLOWED

Seventeen cases of this series were treated expectantly: rest in bed; sedatives and opiates, to yield comfort; general avoidance of meddlesome interference. It is of particular interest to note that of these seven were delivered at full term, despite the fact that three of them had fever on admission to the hospital. Of these seven coming to full term, five had healthy babies; there was one stillbirth, and one productive of a spina bifida (probably entirely an accidental phenomenon). There was one further patient treated expectantly at two and one-half months of her pregnancy, who later was curetted at the seventh month for a missed abortion, that had probably gone on to about four and one-half months' development.

In this same series of seventeen there were four cases that had a temperature of 103° F. on entrance who delivered themselves spontaneously of the fetus and placenta in from eight to twenty-four hours, and were thereafter normal. In none of the remaining did excessive hemorrhage necessitate curettement; the temperatures of all were normal in from one to three days, with the exception of one patient, who on the fourth day developed a temporary rise of temperature that immediately came to normal on the fifth day.

Of the remaining seventy cases that were not given the expectant treatment, all had some form of surgical intervention, either dilatation, curettement, packing, or a combination of all three. One patient seemed to have many repeated instrumentations.

In this series of seventy there were two deaths. One on admission had typical tetanus following a criminal abortion produced some six days before her entrance (no other outcome could well have been expected). Death followed in the other case after various vaginal examinations and treatments, and daily instrumentation in the dressing room for a period of five days. The chart shows that the temperature curve was normal until the fifth day; thereafter signs of peritonitis developed. Her

attending physician gave her repeated doses of Epsom salts and pituitrin; after the peritonitis became more acute he added compound cathartic pills. She aborted on about the sixth day, and death ensued six days later of general sepsis. One hesitates to offer too definite criticism, but this mortality seems inexcusable.

MORBIDITY AND TIME SPENT IN THE HOSPITAL

The average time spent in the hospital by all of the eighty-seven cases was 6.1 days; those treated expectantly averaged 4.9 days; the seven treated with various modifications of surgical intervention remained in the hospital an average of 6.8 days, or nearly two days more than those treated medically.

Of the seventy cases treated surgically, twenty-nine had some temperature following this intervention. As a rule, these temperatures came down on the second or third day thereafter; the most serious cases were preceded by a chill, and in this group twelve mentioned this specifically. In addition, eight cases had some temperature on admission. We should note particularly that four of these were not curetted until four days after a normal temperature; they all did exceedingly well. The other four, curetted at once, had a very stormy convalescence.

A CONSIDERATION OF THE DIAGNOSIS INVOLVED

A study of these cases shows that diagnosis is surely one of the most important problems involved. Manifestly, we should do nothing until we have investigated as thoroughly as we can, and then come to our judgment as to what to do, depending on circumstances:

1. Is our patient pregnant?
2. How long is she pregnant?
3. Is the fetus dead?
4. Is it a case of missed abortion?
5. What complications are present?
6. Is the abortion complete or incomplete,
7. Is our patient septic,
8. If the process of abortion is imminent or occurring, are we dealing with:
 - (a) One started criminally.
 - (b) The result of habitual abortion.
 - (c) Following syphilitic disease.
 - (d) Due to pelvic tumor, or,
 - (e) Lacerated cervix, malposition of the uterus, etc.

A very careful history will help us with all of the above eight factors. Sometimes it will give us an absolute diagnosis and tell us almost everything we have to know. However, we must make careful physical examinations. This includes a thorough inspection of the entire body, taking pulse, temperature, respiration, urinalysis, etc. Knowing as we do the great influence of syphilis*, the various laboratory procedures aiding in establishing that diagnosis will, of course, not be overlooked. Whenever possible, all vaginal discharges that the patient has passed should also be examined. Needless to say, vaginal examinations should never be made on these women without using all surgical aseptic precautions.

DIAGNOSTIC DIFFICULTIES ASSOCIATED WITH MISSED ABORTIONS

This diagnosis is not readily hazarded by the attending physician. This is indirectly suggested by the fact that one physician made all the diagnoses under the grouping shown in this series. Outside of the records here discussed, the writer has previously made this diagnosis once. It must, of course, be definitely established that the product of conception has ceased to grow. As a rule, the uterus does not enlarge after death of the fetus. There are, however, some exceptions, for we may have hydatid formation or polyhydramnion. Of five cases observed, the following features were noteworthy: in all there was cessation of menstruation; in three, uterine enlargement was noted from month to month up to three and one-half months, four months, and five months respectively; thereafter, on repeated monthly examinations the uterine size remained stationary.

In one instance, the differential diagnosis strongly suggested a possible ovarian cyst—the patient had previously been operated on for that condition; there was also a distinct mass to be felt besides the larger one, which was evidently the uterus. The mass that ultimately passed, however, left no doubt as to the correctness of the diagnoses of missed abortion.

Another patient, with an apparent eight months' pregnancy, passed a complete placenta, fetus, and unruptured amniotic sac, with the apparent size

and development of about three months' gestation.

In another instance, a number of physicians had observed the patient, and on the whole agreed that she had a tumor but was not pregnant. Like the preceding case mentioned, she also had never felt life. Unfortunately, she miscarried after about six and one-half to seven months, but the product was lost, and its identification therefore uncertain. Dr. J. C. Litzenburg mentions this condition as being very common, but states that the cause is unknown. He cites cases that have had irregular bleeding, an afternoon temperature, and general signs of intoxication.

THE PROPHYLAXIS OF ABORTION IN GENERAL

This is a very large feature of this subject, and we may only touch on the most important divisions:

1. Treat all luetic suspects, male and female.
2. All cases of endocervicitis should be eradicated.
3. Lacerations should be repaired.
4. Warn the patient in regard to danger of criminal abortions.
5. In abortions dependent on diabetes, anemia and other malnutrition cases, such as tuberculosis, use reconstructive treatment, such as fresh air, plenty of water, good and proper food, rest and blood-forming drugs.
6. Women with aborting habit should be given rest of two or more years before conception is again permitted.
7. Never give any strong cathartic or quinine to pregnant women except possibly cases of malaria.
8. Have patients avoid all infectious diseases as far as possible.
9. Avoid strenuous exercise, especially anything in which severe falls or strains are apt to occur.
10. In the teaching and training of young women it is manifest that they should be trained in proper habits of exercise, diet, and the securing of rest, so that they may expect to possess a normal pelvis and a stable nervous system.
11. Prevent lacerations at confinement.
12. Careful prenatal and postnatal observation of your patient.
13. Avoid meddlesome surgery of the pelvis. In

*Syphilis: Lewis A. Conner, Oxford Med., vol. V, p. 685, quotes Kassovitz—from 330 syphilitics, there were 40 per cent abortions or premature deliveries. Osler: "Earliest pregnancies end in abortions; then dead children born; then premature living children; then full term syphilitic children; finally full term healthy children."

doing any necessary surgery on a pregnant woman be very careful in the handling of the viscera, especially the ovaries.

THERAPEUTIC ABORTION*

Therapeutic abortion is a very delicate subject and should be handled with very great care, and every available method at our command should be used before we ever suggest it. It is very seldom necessary, even to save the life of any patient. This, as a rule, can be accomplished by very hard, painstaking effort. Ascertain the cause of your trouble and you usually can overcome most cases with persistent effort and treatment. I do not maintain that it is never necessary, but we find such men as DeLee enunciating firmly that it is very seldom necessary even in the most extreme cases of hyperemesis gravidarum. He advises the same extreme caution in early tuberculosis, in heart or kidney conditions, or similar states. Therefore, watch your step. There can be no question but that the incautious, not to say unprincipled, among us, have been led into the doing of abortions by the presumed weight of authority advocating this measure.

DETAILS OF TREATMENT, DEPENDING UPON THE TYPE OF ABORTION

Every case of threatened abortion should be put to bed, with complete rest, opiates, restricted diet, and often with ice packs to the abdomen. The adoption of this simple plan will surprise many who are prone to early interference. In this series there were several cases which had quite marked bleeding, some, even, considerable temperature on admission; nevertheless, they went on with the pregnancy and were delivered at full term.

The cause of temperature must always be determined. One patient in this series had a temperature due to a severe, concurrent bronchitis; one a streptococcic sore throat; one an abscess of the posterior vault of the vagina, caused by a crochet hook used with criminal intent. Even this last patient was delivered of a baby girl, perfectly well and normal, the great pride of an indulgent mother.

It is absurd to allow the patient's feelings to sway our judgment in any degree. You would not

commit murder in any other way; why should you do it to please hysterical women or confused girls?

For inevitable and incomplete abortions naturally a quite different course may be indicated. Different authors seem to disagree considerably as to the method. The following considerations may at least be offered:

1. Remember that all criminal cases of abortion are potentially septic, and should be treated as such.
2. No operative procedure should be carried out until your case is afebrile for at least five days. It is stated that a pelvic examination that is followed rather promptly by an increase in the number of leukocytes or temperature gives the hint that the period of delay should be prolonged some days later. Whenever the signs of activity have all abated, you may proceed as if the case were non-septic. (There may be an exception to this if your patient has profuse hemorrhage that threatens life, or you have a fully dilated cervix, with the cord or other material protruding that is easily evacuated.)
3. It can be generally assumed that where the cervix remains closed, external interference is unjustified.
4. In non-septic cases, if you are satisfied that all contents have passed, merely advise rest in bed. Patients that are not bleeding may be put to bed and given small doses of ergot repeatedly; the contents will usually be expelled in twenty-four hours. The uterus may then be inspected with the finger, or a dull curette if necessary. Remember, that the curette has killed more women than it has saved. If a case has frank hemorrhage and the cervix is dilated, remove contents with finger if possible; otherwise with a placental forceps or dull curette. Never use a sharp curette. If the cervix is not dilated you can pack the cervix with strips of gauze, then pack the vagina. On the following day, when you remove the pack, the uterine contents will usually be expelled with it. Or, you may very carefully dilate the cervix best with Hegar's sounds or graduated dilators, and then either with the finger or dull curette remove contents. With patients that apparently have expelled all the contents and still keep up a profuse discharge from day to day, it is sometimes necessary to dilate and curette.

All the above operations must be carried out with absolute surgical asepsis, the same as in any

*Those who practice in Catholic hospitals know full well the attitude of their church on this subject. To the casual and uninitiated this may seem at first glance an extreme position. Going over, however, the whole situation, it is striking how nearly the best obstetrical teaching is coming to approximate the Catholic church's position.

cervical operation. The uterus should be swabbed out with iodine following curettement.

In cases of missed abortion the same rules hold as for incomplete or inevitable abortion. Dilatation and curettage early in pregnancy; after twelve weeks introduction of catheter and tight packing of the cervix; or, as DeLee recommends, trachelotomy.

In all cases gross and microscopical examinations should be made of the uterine contents. You will be surprised how much value this latter will be to you. One case that was in the hospital in the past year died later of chorio-epithelioma. This certainly would have been discovered by careful examination.

Cases that develop peritonitis should be kept quiet in bed, with the head of the bed elevated about twenty-four to thirty inches. Opiates should be freely used and should be given to tolerance, which is usually best judged by watching the respiration. Give continuous proctoclysis of 5 per cent sodium bicarbonate and glucose. Wash out the stomach frequently; as soon as possible give fluids by mouth. If necessary, use hypodermoclysis, intravenous glucose, and even transfusions of blood. It is doubtful whether serums have any particular value.

SUMMARY

We may briefly summarize the salient features as follows:

1. Always be sure that your patient is really a case of inevitable abortion before attempting any surgical interference.
2. Never take the patient's word that she has an incomplete abortion.
3. Never use operative measures on a septic case until the patient is four to five days fever-free.
4. Avoid curettement as much as possible; for conditions associated with pregnancy it is very seldom necessary. The number done in any hospital becomes easily an index of the ethics of the adjacent communities, not to say the medical staff.
5. Never give pituitrin or cathartics in cases of beginning peritonitis.
6. In patients with a tumor mass and history of possible pregnancy be sure to look for missed abortion.

FACTORS IN LONGEVITY*

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In these days one hears many pessimistic views in regard to degeneracy in the race, both moral and physical. Perhaps it has always been so that the older people of the living generation have lamented the loss of virtue and physical prowess that obtained in their youth. Writers are ever busy in trying to stem the pessimistic wave, but in spite of the desire to view things optimistically one cannot help wondering if the pleasures of the young people of today do not indicate a moral degeneracy which must be followed by a physical degeneracy. It is difficult to feel that the dances and music of the younger people does not mean a moral decadence.

Scientific data on the relative physical robustness of the present and past is not readily available, but the general opinion is decidedly that we are losing in robustness and vigor, and there can be no doubt of the decrease in dental vitality which, alone, is a factor of great importance in regard to health and vigor in the immediate future.

Most doctors have been under the impression that the average length of life has increased a great deal in the past ten years. According to the American Table of Life Expectancy there has been no change in twenty years after the age of sixteen. Statistics by the Metropolitan Life Insurance Company just given out show that there has been an average increase of two and three-fourths years in the past ten years, but that this increase is due chiefly to improvement in the early years. We look upon this as a great achievement, but in view of the wonderful progress in medicine, surgery, dentistry and public health, this increase should have been much greater. The greatest advances have been made in the past fifty or sixty years. The great mortality due to the various plagues and epidemics has been practically wiped out. Smallpox, yellow fever, typhoid fever, diphtheria, scarlet fever, etc., are seldom encountered now and are of much lessened virulence. Better knowledge of infant care has lessened infant mortality. Puerperal sepsis is practically a thing of the past. The wonderful sur-

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gery of today has prolonged many lives. We have not so much failed to combat disease as we have failed in our inability to recognize and rectify the things that are blocking progress and causing disease and early decay and death. As a matter of fact, if we had all the scourges and plagues of seventy years ago and the same state of medical knowledge as then, the average length of life would be much less than obtained at that time because of our food conditions and lessened resistance and robustness.

In spite of the wonderful progress in dentistry and care of the teeth, the people are suffering more from dental disease and earlier loss of their teeth. In spite of all the medical and surgical advances the span of life has been increased but little and more doctors are making more money than ever before.

With the progress of civilization some factors have crept into our lives that I believe are potent reasons why the laudable achievements in medical science have been blocked, in a measure, in securing for the people those things so much to be desired, longer life, greater robustness, and less sickness and good teeth.

The most important factors have crept in so insidiously under the guise of improvements that their importance has not been recognized. The most important is food. It would seem that nothing new could be said about this subject. Many will deny that food is a potent factor because there has never been a time when food was so abundant and varied. Better transportation brings us food from every clime. Better storage preserves it and there is practically no food that cannot be preserved in some way. And this is the crux of the whole thing. We are living on preserved foods or foods kept in storage. The bulk of our food is not fresh.

The study of uncivilized and semi-civilized peoples discloses the fact that they have little disease. Cancer is rare. Bad teeth and digestive troubles are uncommon, yet in most instances their food is limited in variety. I wish to bring out clearly the one most important point and that is the value and vital importance of freshness in food. Much has been written about vitamins and about white bread and the canning and preserving of food. Flour ground from whole wheat is better than white flour because it contains the vital part of the seed, the germ, and also the envelope, which contains

mineral and chemical substances of value. But flour made from whole wheat loses in value and flavor when it is stored. The Mexican lives mostly on beans and corn cakes. Seeds of plants with the envelopes unbroken retain their life and freshness a long time. The Mexican grinds his corn in a mortar every day. Nuts, unbroken, preserve their freshness and vitality a long time, but broken or ground-up, they soon become unfit for food. Corn, ground, will not keep long unless it is degerminated. The cornmeal you buy does not contain the vital element, the germ. The difference in flavor in freshly ground grain and the same after storage is quite apparent. In my own household for the past year we have had little white bread, but our bread is made from good wheat ground as used, in a little hand mill. We use no prepared breakfast foods, the freshly ground wheat and corn being much enjoyed by the entire family. In the matter of expense, 60 pounds or one bushel of wheat costs \$1.60. Some of the prepared breakfast foods sold in four ounce packages at 15c cost \$36 for 60 lbs.

Everyone knows the difference in flavor of vegetables fresh from the garden and those bought in the market, and who can doubt that there is a difference in food value? Great variety of food is not necessary, but not objectionable, if fresh and properly balanced. The Esquimaux thrives on a diet of meat and fish. The people of the western part of Argentina live almost exclusively on meat, averaging about five pounds a day. Some people of the South Seas live on little islands built of coral rocks and devoid of vegetation except a few cocoanut palms. Their diet is exclusively fish. These people have wonderful physiques and are most robust.

The study of vitamins is undoubtedly of vast importance and much valuable work has been done on this subject in recent years, but if we could eliminate stored and preserved and over-cooked foods the subject could be ignored, as most any food in the fresh and raw state contains sufficient vitamins. Of course it is not practical for all people under all conditions to have all their food supplied in a fresh condition, but they can be taught the importance of this and at least use more fresh food and less preserved and stored and over-cooked food.

To me, in considering what is meant by freshness, I have in mind the thought of life: the fresh, crisp stalk or leaf of vegetables as compared with

the limp, uninviting leaf of the market-place; the fresh egg that could be hatched as compared with the dead cold storage egg; the live seed that could germinate as compared with the crushed and devitalized and degerminated seed in the form of white flour and other products of the mill; stored potatoes, turnips, carrots, etc., that still have enough life to grow leaves if put in the ground, as compared with the same product canned or dehydrated. In certain foods that are useful, although fermented or decomposed, we still have this element of life, in the form of yeasts or the living mites or germs of cheese, sour milk, sauerkraut, etc., or the poi of the south sea islander.

Added to condition of stale or dead food we have cooking, and especially over-cooking, to further impair or destroy the vitamins and alter the chemistry of the food.

In his travels in the Arctic Circle. Stefansson and his men spent nine months on the ice and uninhabited islands. They carried no provisions, depending entirely upon seals, polar bears and caribou killed on the way. In these nine months there was no sickness, until, on the return journey, they arrived at Winter Harbor on Melville Island. This store contained canned milk, dried fruits and vegetables, flour, salt pork, butter, jam, sugar, etc. Some of the men ate largely of this food, which was excellently preserved, although six years old. In a short time they developed severe symptoms of scurvy, but were soon cured when restricted to raw meat. Stefansson, himself, ate only meat, mostly raw, saying that raw meat is always tender and usually of better flavor than when cooked.

The resistance to disease is further lessened because our foods are practically all ground or cooked and softened and predigested so that the teeth and stomach have little to do and soon degenerate so that they cannot manage the food even when it is already masticated and digested. The teeth were made to tear food and bite it into particles small enough to swallow and the stomach's business is to digest it.

In showing that it is possible to maintain health on a single food, it is not my intention to advocate this. The best diet is undoubtedly a mixed diet of fresh foods. The Arabs are among the most perfect races, physically. They are long-lived and infant mortality is very low. They live out of doors and their diet is simple, consisting chiefly of milk,

cheese, meat and figs. For the most part the most vigorous and aggressive races have been those who fed largely on milk products and meat. Those living principally on grains and vegetables have been inferior, excepting possibly the Japanese. The Tartars who invaded China lived principally upon their herds. McCarristan, in his paper on "Faulty Food in Relation to Gastro-intestinal Disorders," states that during a nine years' residence in remote districts of India he found that certain tribes were of wonderful physique, wonderfully well preserved and unusually fertile and long-lived. While living among them he never saw a case of cancer and practically no gastro-intestinal disease. The reasons he gives for their unusual longevity and freedom from disease are that the infant is invariably fed at the breast; that the people live on plain, natural foods consisting of milk, eggs, grains, fruits and vegetables; they know nothing of canned or preserved foods, and they had little sugar and practically no alcohol. McCarristan also pointed out vigorously the danger of cooking and preserving foods and converting them into a "dead fuel" mass devoid of vitamins. I wish to be understood as going a step farther than this. Because seeds of plants, grains, etc., are so large a part of our food, I wish to show the importance of preserving the envelope and the germ, unbroken until shortly before using. And in addition, I wish to emphasize most emphatically the importance of freshness and prevention of chemical change, except as before noted, in all foods, and the suicidal folly of such widespread tampering with foods as preserving, pasteurizing, drying, etc.

The difference of opinion among medical men as to whether we eat too much or too little is due to the real value of the food. We may eat too much in bulk and still be under-nourished. Certain elements in food seem to be necessary to health. Although Stefansson and his men maintained health and vigor under unusual exposure and hardship on a diet exclusively of meat as mentioned above; this meat was fat meat. At another period when inland on the mainland they had for a considerable time only very lean meat of caribou that were very thin, having practically no fat in their tissues. Very large quantities of this food failed to satisfy their hunger and although they ate vast amounts they lost in weight and suffered from kidney troubles and edematous limbs. If we eat small quantities of devitalized foods the body may be

greatly under-nourished and non-resistant to disease. McCarristan quotes Hindhede, who said, "the two chief causes of disease and death are food and drink."

The Chinese have little meat and no milk but they eat five times as much fresh vegetables as American people do. Their infants thrive without cows' milk because the Chinese mother nurses her infant from two to three years.

Longevity is checked in many instances in infancy when the infant is artificially fed or even if breast fed when the mother is undernourished because of improper food, lacking in freshness or vitamins. It is well known that the milk of cattle fed on stored and dried foods has less vitamin value than that from cattle fed on fresh and green food. Statistics show that the mortality and incidence of disease in artificially fed children is greater than in breast fed infants even though the mothers may not be properly fed. In childhood and early life the diet frequently consists largely of prepared breakfast foods and cereals which are of little value because they are stale and devitalized and which would fail utterly were it not for the milk or cream used with them.

In providing food for the family it would seem that we should, first of all, provide those foods upon which we can depend best for the necessary elements and vitamins, so long as it is not practical to have all our food in a perfectly fresh state, and the rest of the diet may consist of almost any food that taste or comforts may dictate. The diet should first of all include a liberal supply of milk, vegetables and fruit, the remainder of the diet being made up of meats, fats and sweets. A good rule is to provide a quart of milk a day for each child and a pint a day for each adult.

I have attempted to cover too much in this paper and I wish to mention now briefly a few other factors in health and longevity. One of the most relentless and deterrent factors in longevity is the disease and early loss of teeth and this has become a menace of greatest importance. We have disease and destruction of teeth, because of devitalized food and because we do not use them, as our food requires but little tearing and mastication. There is a lack of vitamins in stale and preserved and over-cooked food. The use of the modern tooth-brush is a producer of disease of the teeth. Most people are unclean about their tooth-brushes. Its

use is contrary to the principles of surgical cleanliness. Beginning with a healthy mouth and a new tooth-brush, the bristles pick up particles of decayed food and in brushing the teeth vigorously up and down some of the bristles are pushed up under the gums, depositing their burdens of putrefactive germs where they can be warm and well nourished; the process is repeated every day and between times the brush is hung in a nice warm place where the rest of the bacteria on the brush can multiply. This is one potent factor in the cause of the modern disease of pyorrhea and of dental caries. Either the tooth-brush must be carefully and really sterilized or we must have some arrangement so a new and sterile cleanser can be used each day. People who eat plain, raw, coarse food do not need tooth-brushes.

Another factor of importance in longevity is the modern steam or hot water heated residence and office. Extreme dryness results from the almost universal method of heating and produces colds, catarrhal conditions, deafness and dryness and itching of the skin. A half hardy plant taken from a greenhouse will not survive this atmosphere more than a couple of weeks and air that would destroy a vigorous plant so quickly must have some deleterious effect on health. Not only is moisture important but freshness as well.

There are many other factors that might be considered, such as the prevalent custom of riding in motor cars and consequent lack of exercise from walking. Most people have fewer hardships and exposures than their ancestors. Some of these hardships may have shortened life as some will contend, but they probably for the most part increased vigor and robustness. The doctor who rides about in a closed car cannot well endure a long, cold ride in an open sleigh.

To sum up, longevity can be promoted by more outdoor exercise, by more moisture in heated dwellings and offices, by improvements in the cleansing and care of the teeth, and by eating more fresh foods, particularly the green leaves of plants, tomatoes, fruits and coarse roots and vegetables. At least a quart of milk (clean, raw milk, if obtainable) a day should be allowed for each person, with a reasonable amount of meats and fats, and it is quite practical for every family to be its own miller and have cereals and breads made from freshly ground grains.

CENTRAL BONE TUMORS AND THEIR DIFFERENTIAL DIAGNOSIS: WITH SPECIAL REFERENCE TO THE LATENT AND UNHEALED BONE CYSTS IN ADULTS

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Von Mikulicz was the first to emphasize the clinical fact that the great majority of bone cysts or osteitis fibrosa gave evidence of their presence before eighteen years of age, usually earlier, by pathological fracture, localized swelling, pain or limp. I called attention to this in the early numbers of *Progressive Medicine* for December and again in the *Annals of Surgery* for August, 1910. In the *Journal of Radiology* for March, 1920, in reporting fifty-four cases of benign bone cysts, I reported in detail a few (six) in which the age of onset was over twenty. They may be briefly summarized as follows:

Pathol. No. 5807. Cyst in the trochanter of the femur in a male aged 70. Here there was localized pain and swelling for two years after contusion. When the cyst was explored it had an intact bony shell; the cavity contained clear fluid; there was no connective-tissue lining, and the microscopic section disclosed no evidence of osteitis fibrosa.

Pathol. No. 17871 (See Fig. 2, loco. cit.) was a larger cyst in the trochanter of the femur. Although the patient was twenty-three years of age at the time of operation by Dr. Prince, there has been localized pain in this area for six years, and a slight intermittent limp for six years. This suggests that the age of onset was seventeen. The patient came under observation ten weeks after a trauma which had produced a pathological fracture; this had healed. The lesion in the trochanter was revealed by an x-ray taken at this time. At the operation in 1915 by Dr. Prince there was an intact bony shell, a leathery connective-tissue lining, and clear fluid. The sections from the connective-tissue lining show osteitis fibrosa. There has been no recurrence in this case now seven years since operation.

Pathol. No. 5553. This is an example of the unhealed bone cyst which reaches great dimensions and often involves the epiphysis. This case was illustrated in the *Annals of Surgery* for August, 1910 (Figs. 9 and 10), and closely resembles the one reproduced in the *Journal of Radiology* (Fig. 13). According to the statement of the colored

woman the swelling in the lower end of the femur had been observed at the age of twenty-seven and had been of five years' duration when first seen in 1898. The leg was amputated in 1904, eleven years after onset, and the specimen shows a thin, bony shell with many partitions (polycystic osteitis fibrosa).

Pathol. No. 20646. This is illustrated in the *Journal of Radiology* (Fig. 13). It belongs to the group of unhealed bone cysts which have reached great size (we have six examples of this type now). The patient, a colored man, was thirty years of age when the swelling first began, and thirty-five when the x-ray was taken. There was also a history of a pathological fracture which has healed. In this case the leg was amputated on the diagnosis of sarcoma, but the patient is free from recurrence eight years later. The specimen which I had the opportunity to examine is gross and microscopically osteitis fibrosa. The bony shell is intact, and there is a connective-tissue lining.

Pathol. No. 8324. This is the third huge bone cyst in the lower end of the femur, reported and illustrated in the *Annals of Surgery* for August, 1910 (Figs. 16 and 17). The patient, when first seen in 1899, was twenty-one years of age. There had been pain and swelling in the lower end of the femur six months. At that time sarcoma was diagnosed and amputation advised, but refused. Ten years later, when the tumor had reached very great size, the leg was amputated and the specimen sent to my laboratory.

Undoubtedly these huge bone cysts will now become of historical interest, because few, if any, patients in this country will delay and the patients will not be frightened by the incorrect advice of amputation.

In the *Annals of Surgery* for August, 1910, I reported and pictured a healed bone cyst of the lower end of the fibula which had been present twenty-two years, but as the age at its onset was before the patient was twenty years of age, it was not discussed in the *Journal of Radiology*. Nevertheless it belongs to the group to which I wish to call special attention in this paper. If there had been less swelling in this case and if the patient had been unaware of the long duration of the tumor, and if the x-ray had not shown complete ossification, the possibility of a central sarcoma would have had to be considered.

In 1916 Dr. Roche, pathologist to St. Vincent's Hospital in Norfolk, Va., sent me a mass of firm, leathery tissue, which had been curetted from the

center of the shaft of the tibia (Pathol. No. 20296). Dr. Roche informed me that the x-ray showed an intact bony shell. The female patient was twenty-six years of age and had observed swelling in this region for five years. At the exploratory operation the bony shell was filled with this firm fibrous tissue. It was removed with the curette, and there has been no recurrence after six years.

This case of Dr. Roche belongs to the group of solid osteitis fibrosa of which I reported seven cases in the Journal of Radiology and reproduced an x-ray of one (Fig. 89). I reported this group again, with illustrations, in the Southern Medical Journal for December, 1920 (vol. xiii, p. 88).

Dr. Roche's patient was the only one of these seven who at onset was over twenty.

Latent Unhealed Bone Cysts in Adults, Suggesting the Possibility of Central Sarcoma or the Giant-Cell Tumor. Since the publication of the article in the Journal of Radiology, now two years ago, observations similar to that of Dr. Roche have increased in number, and the group allows a very interesting and important discussion of the central bone tumors in adults and their differential diagnosis.

Pathol. No. 27375. The x-ray (Fig. 1) was sent to me in January, 1921, by Dr. Donald Guthrie of Sayre, Pa. It shows a central lesion of the shaft of the tibia with an intact bony shell, except for the recent fracture, and a fracture of the fibula which shows no other pathological lesion. This patient was a white female aged forty. There is a history of an injury four weeks ago with evidence of fracture—pain and swelling. The only significant fact in the previous history was that this patient remembered distinctly an injury to this leg in childhood which was followed by pain and limp for some time, and had then given no trouble until the recent trauma. Dr. Guthrie saw this patient four weeks after the injury. He was rather of the opinion that the injury had been slight and suggested a pathological fracture. The leg was swollen and tender in the region of the middle third of the tibia. Dr. Guthrie wrote then as follows: "We have considered four possibilities—gumma, central bone abscess, cyst, and sarcoma. The Wassermann reaction was negative." My advice was as follows: "Explore, curette with the electric cautery, follow this by fifty per cent solution of zinc chloride, and then pure carbolic acid followed by alcohol, and if you have radium and think it is sarcoma, introduce needles."



Fig. 1. Path. No. 27375. Latent unhealed bone cyst. Female, age 40. X-ray four weeks after fracture.

Dr. Guthrie wrote me January 17: "I curetted this morning. Apparently it seemed to be a sarcoma, but our frozen sections looked to us more like a myxoma or spindle-cell sarcoma of low malignancy. I sterilized the cavity with carbolic and alcohol and put in 50 mmg. of radium."

I reported to Dr. Guthrie that the tissue which he sent me showed osteitis fibrosa.

Then Dr. Guthrie wrote me as follows: "I am satisfied from reading your reprint and comparing it with my operative findings that the tumor is osteitis fibrosa. There was no connective-tissue lining of the bony shell, nor did the cavity contain any viscid fluid. There was some blood clot present within the cavity due to recent fracture. The gelatinous material which I found in evacuating the cavity was undoubtedly due to small bone cysts in the central area of fibrous tissue."

Apparently, therefore, the bone cavity was filled with an area of fibrous tissue with little cysts in it containing gelatinous material.

Result. It is now more than one year since the operation. The area has ossified, and the patient is well.

I have given this correspondence between Dr. Guthrie and myself in detail, because every surgeon, roentgenologist and pathologist, when confronted with a case of this kind, naturally thinks of sarcoma, and therefore concludes, if it should prove to be sarcoma, that the area of involved bone must be either resected, or amputation performed.

My experience up to date with central lesions of bone in which the bony shell is intact and in which there may or may not be a recent fracture, is that the differential diagnosis between the various possible central pathological lesions can-

not be made from the x-ray only. If the patient is fifteen years of age or younger, there is every probability that the lesion is a benign bone cyst. However, myxoma and chondroma are possible. The latter are usually observed in the phalanges, metacarpal and metatarsal bones, and there are a few benign giant-cell tumors in younger individuals. If the patient is over fifteen, a history of a previous injury, as in Dr. Guthrie's case, is suggestive of a latent unhealed bone cyst. The involvement of the epiphysis in the central shadow almost rules out the bone cyst and suggests either the giant-cell tumor or the sarcoma.

The question to be decided is this: What shall be our procedure of attack when an adult comes under observation with an x-ray picture showing the central lesion with an intact bony shell, with or without evidence of a recent fracture?

I can only give the conclusions which are based chiefly upon recent observations and restudy of all the material that I have had the opportunity to investigate.

The possible central lesions, based upon actual experience, are as follows:

The *benign giant-cell tumor* is most common between the ages of twenty and twenty-five. This lesion usually involves the epiphysis and pathological fracture is rare; if it does take place, it heals, but without ossification of the central area. The usual symptoms are the localized pain and the expansion of the bony shell. Extreme pain and tenderness are not often observed, but they may be present.

The *central sarcoma*. This tumor with an intact bony shell is comparatively rare. It also is more apt to involve the epiphysis. The age of onset varies from sixteen to old age. Pathological fracture is a late symptom. I have no evidence that the fracture ever heals, although in the older literature such observations are recorded. As a rule there is extreme pain and great tenderness, also much loss of function of the adjacent joint, without any evidence in the x-rays of joint changes to explain this.

It is to be remembered that the possibility of a cure by amputation of a central sarcoma has rarely been accomplished, because of early metastasis to the lungs.

Bone Cysts (Fig. 1). In adults these have occurred with pathological fracture or have been revealed in an x-ray taken immediately after a contusion of a bone or joint, or because of localized pain.

Chondroma and Myxoma. These tumors cannot be recognized by their x-ray pictures. The central chondroma in the lower end of the femur reported in the Journal of Radiology (Fig. 15, Pathol. No. 22016) was found accidentally in the x-rays of numerous joints in a patient who was suffering with pain of many joints. Its pathology was established at the exploratory incision, and the patient is well years after curetting and radium.

The central myxoma of the astragalus reported in the Journal of Radiology (Fig. 28, Pathol. No. 22929) was diagnosed in the x-ray as arthritis, and was not revealed until the bony shell was partially removed. This central tumor was curetted without thermal or chemical cauterization, and it recurred. The details of this important case have been reported in the Annals of Surgery for December, 1920 (vol. lxii, page 712), and I refer to this article for a complete review of myxomas of bone.

Central chondroma usually involve the phalanges, less frequently the metatarsal or metacarpal bones. A complete review of all of our cases has been made by Mr. Garrett, of the fourth-year medical class of the Johns Hopkins Medical School and will soon be published. Central chondroma of the long pipe bones is rare.

I have never seen *tuberculosis* giving the picture of a central bone lesion in adults, except when other bones have been involved (See Journal of Radiology, Fig. 37, Pathol. No. 23552, and Fig. 38, Pathol. No. 23895. In the latter the outer bony shell is destroyed).

Chronic osteomyelitis of the Brody abscess type I have never seen with an x-ray picture at all identical with the central bone lesions just discussed.

In the central giant-cell tumor, sarcoma, chondroma, myxoma, and in the bone cyst there is never evidence in the x-ray of new periosteal bone overlying the bony shell which, if present, is suggestive of osteomyelitis or periosteal sarcoma.

Multiple Myeloma. In the older literature this disease came under observation with evident involvement of many bones, cachexia, and Bence-Jones bodies in the urine. Some fifteen years ago I observed with Dr. George Crile of Cleveland a central tumor of the outer half of the clavicle. There had been pain for some months and swelling a few weeks. This x-ray was shown by Dr. Crile to many roentgenologists and pathologists. No one made the correct diagnosis. After resection of the clavicle, the pathology of the tumor was suggested in the gross and identified in the section as myeloma. A catheterized specimen obtained im-

mediately after operation gave the Bence-Jones reaction in the urine. In this case not for some weeks after the operation did the x-ray show evidence of involvement of the ribs and other bones, and the patient died within a few months. Had the urine been examined for the Bence-Jones bodies before operation, the correct diagnosis would have been made.

From my more recent experience I am inclined to think that this hopeless disease will come more frequently under observation with a single bone involvement.

Metastatic Tumors. We have just reviewed some forty cases. In the majority of instances it was not difficult to get a history of the primary malignant tumor—usually carcinoma. In addition, the x-ray revealed the involvement of more than one bone. In a few cases in which the x-ray showed but a single bone involvement and in which the evidence of the primary malignant disease was obscure, the x-ray was often suggestive of metastatic carcinoma, because of the evidence of some bone formation in the central shadow.

Multiple primary central sarcoma of bone, usually of the endothelial type, is rare. I have not sufficient cases to allow any positive conclusions as to a more certain recognition.

Latent Unhealed Bone Cysts of the Lower End of the Femur.

Pathol. No. 27057. This patient, F. D., aged 33 years, was referred to me by Dr. Joseph Findlay, of Altoona, Pa. Figure 2, an x-ray, shows the contrast between the lateral view of the lower ends of the femora. One will observe that the condyles of the left femur are slightly expanded, and mottled, lighter areas are seen up to the junction of the condyle with the shaft. The bony shell is intact, the joint uninvolved. The antero-posterior view (not reproduced here) shows that the changes are chiefly confined to the internal condyle.

When we consider the age of the patient and the position of the shadow indicating disease, one would think of the giant-cell tumor, or a possible early sarcoma. However, the history suggests an old affair. This man's left knee has been flexed about 25 degrees from full extension since he was a boy of fifteen, when he remembers having trouble. Motion in the knee joint was unimpaired up to 25 degrees of full extension. The patient, while at work, sprained his knee, and the x-ray was taken twelve days later, simply as a matter of precaution. Every other examination was negative. It was my conclusion that this was an unhealed

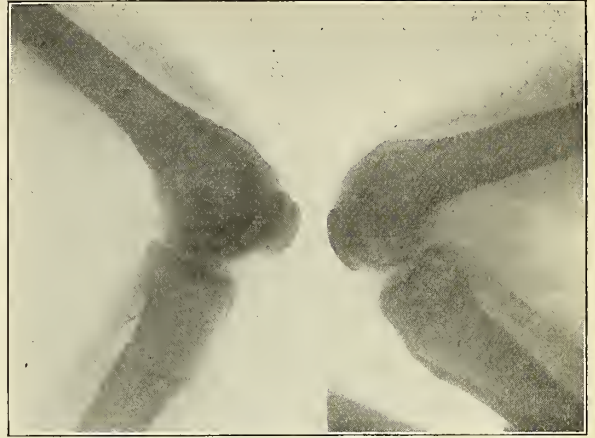


Fig. 2. Path. No. 27057. Latent unhealed bone cyst. Male, age 33. X-ray ten days after injury.

bone cyst. However, it seemed safer to explore. Such an operation hastens the healing of the bone cyst when there is no fracture and, if the central tumor proves to be a benign giant-cell tumor, a chondroma or a myxoma, there never will be a better opportunity for removing the tumor with the curette combined with chemical and thermal cauterization. In all of these groups I have examples of permanent cures. Should the explored tumor prove to be sarcoma, my recent experience indicates that we are justified in attempting a cure by the same method. What evidence I have, suggests that the effects of radium on a central tumor is better if applied into the bone cavity after this type of curetting. More than one year ago my colleague, Dr. Bunts of Cleveland, followed this method in a central tumor of the upper end of the humerus in which the bony shell was intact, and the patient is well today.

Operative Findings. When the periosteum was stripped back from the bony shell of the internal condyle, the outer surface looked normal. We then removed a piece of the cortical bone and exposed a cavity in the internal condyle containing clear fluid, and the bony shell was lined by a white, leathery membrane of connective tissue from 1 to 2 cm. in thickness. Beyond the connective-tissue lining there was evidence of new bone formation. The gross pathology, therefore, was identical with the numerous bone cysts in children under fifteen years of age which I have recorded in previous communications. The microscopic section showed osteitis fibrosa.

The closed wound healed, and this patient now, more than one year since operation, has good function and almost full extension.



Fig. 3. Path. No. 29461. Metastatic hypernephroma. Single lesion. Clinical diagnosis multiple myeloma.

Latent Unhealed Bone Cyst of the Lower End of the Femur Diagnosed Sarcoma and Subjected to Amputation Through the Middle Third of the Femur.

Pathol. No. 19179. This case was reported by me in the *Journal of Radiology* for March, 1920 (Figs. 23 and 24), as an example of a cured case of central sarcoma. It has been registered with Codman of Boston and accepted. I have restudied this case most carefully recently with the conclusion that it is not sarcoma, but *ostitis fibrosa*. Ewing, in writing his report, accepted it as a spindle-cell sarcoma, but, nevertheless, in describing it, he writes that it reminds him of a case of *ostitis fibrosa* which we had studied together and in which his first diagnosis was sarcoma and later agreed with me that it was *ostitis fibrosa*. This observation was also published in the *Journal of Radiology* (Fig. 89, *Pathol. No. 25656*). Fortunately, in this instance, the central tumor with pathological fracture in a boy aged sixteen was simply curetted, and the patient is well with good function more than two years since operation.

The x-ray in my case, in which I diagnosed sarcoma and amputated, shows an unhealed fracture between the shaft and the condyles of the femur

with little or no callus formation, and a central tumor with a thin, intact, bony shell. The epiphysis was involved, which is unusual in *ostitis fibrosa*, but present as noted in the previous cases.

This patient, aged about thirty, sustained a fracture of the lower end of the femur; the fracture did not heal; it was explored and a piece sent to me for diagnosis. I looked upon it as a spindle-cell sarcoma and advised amputation. The gross pathology is illustrated in the *Journal of Radiology* (Fig. 25). There was a central cavity filled with fluid, then a thick mass of tissue which somewhat resembled fibrosarcoma or *ostitis fibrosa*; then a bony shell. There was very little evidence of new bone formation in the area of the fracture. This patient is well now more than five years since the amputation.

This case illustrates how frequently a benign lesion may be mistaken by individuals of the largest experience and who have given special study to the lesion in question. It also illustrates the importance of submitting our so-called cured cases of malignant disease to a number of pathologists.

Multiple Myeloma Coming Under Observation With Involvement of a Single Bone and Without Bence-Jones Bodies in the Urine.

Pathol. No. 29461. Fig. 3. This patient has been carefully observed by Dr. M. A. Bachman of McKeesport, Pa., and he has sent me a complete history and a series of x-rays.

The patient, a white female, aged sixty-five, came under his observation twelve weeks after a fracture of the shaft of the humerus from a slight injury. This was about January 7, 1922. X-rays of the entire skeleton were negative of other bone lesions; there were no Bence-Jones bodies in the urine, and all other examinations were also negative. The slight fracture healed, but no other change showed in the x-ray, one of which, taken after the fracture had healed, is illustrated here. The only suggestive evidence was that the patient was not well. She had more pain in the arm after the healing of the fracture than should be expected; her appetite was poor.

Now, three months after the first observation and about six months after the fracture, Dr. Bachman reports Bence-Jones bodies in the urine.

As far as my evidence goes this is almost positive of multiple myeloma.

Note: April 14, 1922. Dr. Bachman has just sent me the x-ray shown in Figure 4. When compared with Figure 3, it shows expansion and be-

ginning destruction of the bony shell. The patient is suffering great pain in the arm. The urine is filled with albumin, casts and Bence-Jones bodies. The patient shows cachexia, but x-rays of the entire skeleton as yet show no other lesion.

Sept. 1922. In this case, Path. No. 29461, in which the diagnosis was made of multiple myeloma on the presence of Bence-Jones bodies in the urine, the arm was amputated and the sections of the central tumor revealed a metastatic hypernephroma. This observation shows that metastatic tumors may be associated with Bence-Jones bodies in the urine.

Recently I have seen with Codman an x-ray of the humerus so closely resembling Figure 3 that I remarked to Codman, "This may be a metastatic hypernephroma." The guess was correct.

When Is Exploration Justifiable in Central Bone Lesions With Intact Shell, With or Without Recent Fracture? The rarity of a permanent cure after amputation for periosteal or central sarcoma of bone as first emphasized by me in the Journal of Radiology for March, 1920, and confirmed by Codman in his Registry of Bone Tumors, has created a reaction in the minds of the profession throughout the country and has led to treatment with radium or the x-rays, without operation.

I have carefully restudied all my evidence, and

I believe this changed attitude is largely incorrect.

I will confine my remarks here to central lesions in patients over fifteen years of age. First, I have demonstrated in this paper, confirming my remarks in the Journal of Radiology, that unhealed bone cysts may be unexpectedly revealed by the x-ray in adults. For such a lesion, x-ray or radium treatment is unnecessary. Only an exploration will reveal the benign lesion and simple curetting is sufficient.

For the central giant-cell tumor most common between the ages of twenty-five and thirty-five, radium, from my experience, is *not* specific. From personal communications and from the literature, the impression has been that radium alone will cure the giant-cell tumor. If my evidence is correct, radium does not affect the giant-cell tumor when the bony shell is intact even when radium needles are introduced.

It has been established that the giant-cell tumor does not recur if properly curetted with thermal or chemical cauterization. Delay in thus curetting may be associated with further destruction of the bony shell. The functional results after curetting depend upon the preservation of a bony shell. Nothing can be gained by delay.

This exploration may reveal a rare chondroma, or a myxoma, and the evidence is in favor that thermal and chemical cauterization with curetting offers more than radium or x-ray treatment.

At this exploration the rare and rarely cured central sarcoma may be revealed. What should be done in a case of this kind? From my recent experience, it would seem justifiable to curette with the cautery followed by chemical disinfection and the introduction of radium into the bone cavity. This was done by Dr. Bunts of Cleveland in the following case.

Pathol. No. 26792. The patient was referred to me in September, 1920, by Dr. Bunts. The x-ray showed a central lesion of the upper end of the humerus completely involving the epiphysis, with the bony shell intact. The age of the patient—sixteen—favored a bone cyst; the involvement of the epiphysis and the age favored a giant-cell tumor. The intense local pain and tenderness and the loss of joint function (due to pain) without evidence in the x-ray of fracture or joint involvement, favored sarcoma, which at that time I had never seen at this age. I advised Dr. Bunts to explore, and if it proved to be a bone cyst to curette; if a giant-cell tumor to curette with thermal and chemical disinfection; if sarcoma to



Fig. 4. Path. No. 29461. Metastatic hypernephroma. This x-ray was taken a few months after Figure 3 and shows beginning of destruction of bone shell.

resect and transplant bone. The father, however, would not consent to the latter. When Dr. Bunts explored, he found a good bone shell with no evidence of infiltration. He curetted with chemical and thermal cauterization, introduced radium, left the wound open, continued radium and x-ray treatment with Coley's serum, and he has just written me (March, 1922) one year and five months after operation, that the boy is apparently well, and the wound has healed; there is some restriction of joint motion; the patient has gained thirty pounds in weight. September 1922, well.

It seems to me that Dr. Bunts has established a justifiable procedure which seems to offer as much as amputation or resection when the bony shell is intact.

In going over the cured cases of sarcoma in the Mayo clinic with Drs. McCarthy, Meyerding, and Brothers, we found one of their patients well seven years after amputation, in which the first operation had been curetting. The tumor was central in the lower end of the femur; the curetting was not as thorough as in Bunts' case; nor was there any x-ray, radium or Coley serum after treatment. The amputation was one year after the curetting.

What to Do in Case of Doubt. When one explores a central tumor with an intact bony shell and is unable to positively rule out sarcoma the treatment should be the most thorough destruction with the cautery, with swabbing the bone cavity with pure carbolic and alcohol and 50 per cent chloride of zinc, followed by the introduction of radium; this to be followed by postoperative x-ray and radium treatment.

Bone cavities have been swabbed with pure carbolic and alcohol and packed with 50 per cent chloride of zinc gauze without harm for years. Hinds, of London, curetted a giant-cell tumor filling the lower end of the femur in 1895; he packed the wound with zinc chloride gauze. This patient is alive in 1922, twenty-seven years later; the limb has good function, and the x-ray shows bone formation; the wound has healed. I first curetted a giant-cell tumor of the upper end of the tibia in 1902, twenty years ago; I used only pure carbolic and alcohol for chemical cauterization.

Recently I have burned the bony shell with the electric cautery for the giant-cell tumor and the chondroma. This has not affected the healing of the wound, nor the ossification of the cavity.

This evidence in favor of exploring a central tumor with an intact bony shell will be repeated in greater detail in another paper now in course of

preparation in which I will report all the central tumors of the upper end of the humerus. I have selected this group because I find an example of every type of tumor.

This paper is written chiefly to emphasize the occurrence of the unhealed or latent bone cyst in adults which can rarely, if ever, be distinguished from other central tumors, and I am inclined to think the number of such cases will increase, because x-rays are now more frequently taken when the patient complains of slight pain or loss of function.

To repeat in conclusion, the most common central tumor in bone with an intact bony shell, with or without fracture, is the giant-cell tumor. I am inclined to think that the next most common will prove to be the unhealed or latent bone cyst; then, perhaps the condroma and a few myomas; and, the most rare, the primary central sarcoma, the metastatic carcinoma, and the multiple myeloma involving on bone.

Radium treatment is unnecessary for the bone cyst. Proper curetting without radium is sufficient for the giant-cell tumor. If the bony shell is intact it seems justifiable, in the central sarcoma, to try first thermal and chemical destruction with radium, as employed by Dr. Bunts.

Indications for Resection. In central tumors with intact bony shell the functional result is so perfect after resection that it seems unnecessary even to explore. This is true in the lower end of the ulna and the upper end of the fibula. I have discussed this in the *Annals of Surgery* for April 1919 and in the *Journal of Radiology* for March 1920.

Note: Since this paper was written other examples of the latent and unhealed bone cyst in adults have been observed. And a number of cases of central benign giant cell tumor have been subjected to curetting with the electric cautery and chemical cauterization. X-ray studies of these and former cases receiving the same treatment demonstrates that this more thorough curetting with thermal and chemical cauterization does not interfere with wound healing or ossification. As yet no further opportunity has arisen to test this method in the rare central sarcoma with intact bone shell.

I have noted the change of diagnosis in the case illustrated in Figure 3.

The patient operated on by Dr. Bunts of Cleveland reported in this paper remains well.

The method of attack in periosteal bone lesions is different and will have to be discussed in another communication.

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EDITORIAL

Minnesota State Meeting

Elsewhere in this issue appear the announcements and preliminary program of our annual meeting. It is safe to predict that with the increase of 116 since last year in our membership, the Minneapolis meeting will be the largest in the history of the Association. October seems to be the popular time of the year for medical conventions but our dates do not conflict with those of the Tri-State Medical Association, the Mississippi Valley Medical Association, nor the Mississippi Valley Tuberculosis Conference, all of which convene in October and notices of which appear in this issue.

There is a feeling commonly expressed that we are being overloaded with medical meetings. There is a very definite danger that we may acquire such a diversity of society interests that our county and state organizations in time may suffer. There is no indication of any such state of affairs in connection with the forthcoming state meeting. A greater number of addresses will be read this year than ever before and the time has undoubtedly come for the consideration of the desirability of dividing our meetings into more than the two sections—Medical and Surgical.

The medical section this year is restricting each participant to the reading of a ten-minute abstract

and discussions will follow the presentation of all the abstracts at each morning or afternoon session. This procedure has been necessary to accommodate the large number of medical papers. Next year the situation is likely to become more acute and a thorough consideration of the question of further sectional division should be taken up at the coming meeting.

Graduate Medicine in London

To give a brief and proper evaluation of London postgraduate medical opportunities is indeed difficult. From casual contact most overseas visitors are apt to magnify the difficulties encountered and bewail the lack of centralization and coordination found. In this respect conditions in Chicago and New York with a great abundance of clinical material are no different. Vienna has long been the mecca, particularly of American physicians seeking study abroad; there, the material was available, routine courses were provided, and men conversant with the best and most fundamental knowledge of their specialities were willing to give time and instruction to their classes. It should be possible, in English speaking countries, to provide similar opportunities. To bring this about it is not only necessary that certain decisive steps be taken locally, but in addition, the visiting physicians must be willing to cooperate and show their appreciation for what is being done.

In this line, every visiting medical student going to England should get in touch with the following:

1. The "American University Union" (London Branch) at 50 Russel Square, W. C. Dr. G. E. MacLean is Director of the British Division and has a well equipped and central office acting as a general buffer between the conservative Britons and the more or less eager Americans desiring action and opportunity. Dr. MacLean is well known in Minnesota, where he was the predecessor in the English Department of Dr. Richard Burton, and later was chancellor at both Nebraska and Iowa Universities respectively.

2. The American Union is working in close association with another very important body known as "The Fellowship of Medicine," quartered at No. 1 Winpole St., in the beautiful home of "The Royal Society of Medicine." Some credit is due the late Sir William Osler for assisting and developing this very useful fellowship. He lent his judicious and discerning faculties to an attempt to make available for postgraduate medical instruction some of the

vast material assembled in the various London hospitals and dispensaries. Any inquiry directed to the secretary, Miss M. A. Wills, will be promptly acknowledged. They publish a bulletin at regular intervals giving a full list of courses, the hours, dates, and locations. It would be unfair to infer that this Fellowship or Bureau is fully developed and functioning now as well as the old A. M. A. of Vienna. It is too much to expect that an organization so recently in the field and developed during a period of postbellum uncertainties that has greatly taxed not only the London hospitals, but their staffs as well, should attain full stature without opposition and difficulties. However, now is the time to give it support and this splendid beginning merits our unqualified approval. Those visiting London should do all they can to conform to its regulations and associate themselves with the Fellowship.

The many well known hospitals of London are great landmarks in the advancement of medical science and nothing could be more inspiring than a visit with particular attention to their historical development, their teaching associations, and their wonderful museums. I wish to call attention particularly, however, to the peculiarly unique special hospitals of which London has an unusual number: The Royal Westminster Ophthalmic Hospital; St. Mark's Hospital for Diseases of the Rectum; Paddington Green Children's Hospital; Hospital for Epilepsy and Paralysis; the well known Brompton Tuberculosis and Chest Hospital; but most of all from my personal knowledge and contact must I mention and allude to the National Hospital for Diseases of the Heart, at West Moreland St., W. I.

It is very doubtful whether there is a larger assemblage of cardio-vascular material, better studied or controlled anywhere in the world than in this little institution hidden away in a building with little to differentiate it from its sober surroundings. There are only about fifty bed-patients; but these are chosen from a perfectly huge out-patient service, which in turn is largely referred from other hospitals and dispensaries or from private practitioners. During and since the war they have had much to do with the study of recruits and the disabled. Furthermore, anyone interested in the social aspects of medicine as practiced in England today can glean much from witnessing the great crowds that daily assemble to be checked off and directed, both medically and sociologically. In the time available the men succeed in doing a very great deal

for these heart cases and assist in dispelling the idea that the English cannot "speed up"; a good history, a routine physical examination, and usually an electrocardiogram and fluoroscopy is done and accomplished all within a comparatively few minutes. This comes from careful organization and from long contact with the immediate propositions involved in cardiac disease. It is a strong argument in favor of this type of concentrated specialism. On different days the service is in charge of different men. One need not expect among them either uniformity of opinion or method. This furnishes a measure of wholesome diversity, since on the whole they arrive at about the same ultimate opinion as to the patient's capabilities. In this respect one will rarely see better judgment exemplified in the direction of people already inclined to an introspective estimation of their own difficulties; and indeed the problems involved in the estimation of disturbances in cardiac rhythm and functions are difficult enough. Goodall remarked that after some twenty years of intensive study as a teacher of physiology and keen attention particularly to the heart he entered this service to find that the daily problems confronting them were so novel and baffling as to render him only conscious of his inadequacies. In this frank admission, perhaps, can be seen the stimulus which has induced these men to so carefully build up a physiological estimation of the cardio-vascular system and to carefully tabulate and correlate their data. So now after some years their fund of material and knowledge is a veritable medical treasury. Particularly is it so for those whose experience and personal contact have shown them the applicability of this storehouse. In a word, English medicine deserves great credit for properly directing a study and interest in physiology in contrast to intensive investigation of anatomical *mechanical defects*. Men thoroughly conversant with their problems rarely make the elucidation thereof cumbersome and complex; it is a pleasure, therefore, to find the electrocardiograph in daily use, an efficient and precise instrument to assist the physician in determining the extent of pathology and not simply a further mechanical device for throwing out a smoke screen in the Inner Sanctum.

If the teaching opportunities as a whole offered by the Fellowship can be judged from those given in the National Heart Hospital, then indeed London can soon assume a very high place in graduate medical instruction.

E. L. T.

The Gorgas Memorial

Plans are under way for the establishment of a fitting memorial for the late Major-General William C. Gorgas. An institute with an endowment of six and a half million dollars to be located at Panama City and to be known as the Gorgas Memorial Institute of Tropical and Preventive Medicine is proposed in conjunction with which there is to be established in Tuscaloosa, Ala., the Gorgas School of Sanitation for the purpose of training county health workers, sanitary engineers and public health nurses especially for work in the south. The institute at Panama will be devoted to the study of tropical and infectious diseases with a hospital, laboratories, departments for research and all other facilities required for this sort of work and will continue the type of work developed by General Gorgas and so urgently in need of further study and application.

The stimulating suggestion was made by President Porras of Panama and as a starter the Panama government has donated the large Santo Thomas Hospital and the location for the proposed institute.

The project should be of international interest and donations will doubtless be forthcoming from all countries particularly in the western hemisphere. The tropical states will be most benefited by such an institute but our southern states should be particularly interested. The benefits to be derived by even our northern states are not to be minimized considering the modern ease of transportation of individuals and infectious diseases.

The central committee of this project is headed by Admiral Braisted, ex-president of the American Medical Association, and the Board of Trustees of the A. M. A. has appointed the following committee to act for the Association: Dr. George E. de Schweinitz, Philadelphia; Dr. Charles W. Richardson, Washington; and Dr. Fred B. Lund, Boston.

There should be a hearty response from the medical profession, both individually and through our various organizations, to this appeal to help perpetrate the memory of one of our profession in such a fitting way. Checks should be drawn to the order of the "Gorgas Fund" and should be mailed to the American Medical Association, 535 North Dearborn Street, Chicago.

Osteopathy and Chiropractic

We are reproducing for the benefit of our readers the official report of the Council of Massachusetts Medical Society received by that society at its last annual meeting. This report gives, we believe, an unbiased opinion of the status of these two so-called cults which, as is shown in the report, are not cults but therapeutic methods based on unproved theories.

REPORT OF THE COMMITTEE TO INVESTIGATE THE MEDICAL CULTS

Your committee, which was appointed in June, 1921, to study osteopathy and chiropractic, submits the following report in which the subjects of osteopathy and chiropractic will be taken up separately. As the committee found that there was a general lack of appreciation among the members of the medical profession in regard to just what these medical cults signified, some space will be devoted to a description of them.

OSTEOPATHY

Osteopathy was founded by a doctor of medicine. It depends upon a theory. It is not clear to the committee whether the theory was evolved before some results were obtained from treatment or after. The theory, as advanced by Dr. Still, the founder, consists in the belief that the human body contains all of the elements necessary for health, and if the circulation within the body is normal, these elements will maintain health. The impairment of circulation, so that these elements contained in the body cannot be properly supplied to all parts, is the cause of disease. This impairment of the circulation is produced by the action of the vasomotor nerves. These in turn are affected by direct pressure from bones, muscles or ligaments in the region of the spine or by reflex irritation from disturbance in visceral organs or other parts of the body.

In the later books on osteopathy the term "inhibition" appears. Inhibition apparently is the relief of pain and spasm by the application of steady pressure. It is not clear whether this was included in the original theory or added afterwards. According to Still's original theory there is no need for the vast amount of medical knowledge which has been accumulated for centuries, because it is only necessary to discover the lesion which is causing the disturbance in the circulation, correct that and health will result.

Your committee was unable to find any experimental or other scientific evidence in support of this theory, although in recent years an institute for research has been established in California for osteopathic problems. Your committee naturally considers it absurd to throw over all the accumulation of facts that has been produced by medical science for a theory which is unsupported by experimental work or other convincing facts. Your committee further feels that the osteopaths themselves, at the present time, do not feel that this theory should replace all medical knowledge. For it is quite striking to note in the osteopathic literature that the more recent the book, the more use is made of general medical knowledge so far as diagnosis is concerned and the employment of generally recog-

nized therapeutic agents other than drugs. Also it is evident from conversation with members of the osteopathic profession that the rigid interpretation of the old theory is being, in part at least, abandoned.

The question arises, therefore, what is osteopathy today? Osteopathy today is really a therapeutic agent which is used for the treatment of any and all pathologic conditions. That this contention as to the real nature of osteopathy today is correct seems justifiable from the fact that the osteopathic books speak of osteopathy as a therapeutic agent which is contrasted chiefly with one of the therapeutic agents used in general medicine, namely, drugs. Furthermore, in the State of Massachusetts the General Court has legislated that osteopaths and all others practicing the healing art must fulfil the same requirements in regard to general medical knowledge as regular physicians who desire a license to practice medicine, and having so done they may use any therapeutic agent they wish. Your committee therefore feels justified in looking upon osteopathy as a therapeutic agent and has endeavored to find out the value of this therapeutic agent.

The osteopathic treatment consists in the relief of the so-called osteopathic lesion which is claimed to be present in all diseases. It is important, therefore, to understand just what is meant by the so-called osteopathic lesion. Unfortunately, one forms the opinion from reading that the osteopaths vary somewhat in their conception of the osteopathic lesion, but in general they agree that the lesion consists in certain abnormalities situated chiefly in the muscles, ligaments or joints along the spine. These abnormalities consist of a slight displacement of articular surfaces which may or may not be demonstrable by inspection, palpation or x-ray, a localized tenderness, and a spasm of muscles. They claim that this combination of abnormalities or osteopathic lesion should be found at some point along the spine in practically all diseases. The site of the lesion varies with the localization of the disease. Although they claim that there is some specificity of the lesion so far as location is concerned, there is no specificity of the lesion for different diseases in the same organ. In other words, tumor of the kidney, nephritis, tuberculosis of the kidney and pyelonephritis would all present a similar osteopathic lesion along the spine.

Your committee had an opportunity to see a member of that profession look for the osteopathic lesion in various disorders. In some of them he was able to demonstrate a so-called osteopathic lesion, in others he was not. It seems, therefore, to your committee that the presence of this osteopathic lesion in all diseases is not an established fact. The presence or absence of this so-called lesion in disease could be definitely settled, it seemed to your committee, by a careful study of cases by a suitable group of doctors in conjunction with those trained in detecting the osteopathic lesion.

Assuming for the moment that an osteopathic lesion may be present in all disease, what is the method of treatment which is the therapeutic agent peculiar to the osteopathic physician? He endeavors by manipulation and with the assistance of inhibition to reduce the lesion, namely, to correct displacement of the bony surfaces, if any exist, and to relax the muscular spasm and remove the point of

tenderness. Granting for the moment that an osteopathic lesion is present and that it may be reduced, both of which presumptions are still unproven, there is no satisfactory proof obtainable that in the great mass of self-limited acute infectious, toxic diseases and incurable chronic disorders this treatment affects the course of the disease. So far as your committee can find, no careful comparative studies have been made on the value of osteopathic treatment in addition to other procedures. Before any claim is justified for the value of this treatment a careful study of a large group of cases should be made in which the usual therapeutic procedures are tried on half the patients and the same procedures plus the osteopathic procedures on the other half.

It became obvious, however, to your committee during their studies that in a group of less well defined conditions, such as lame and painful backs from various causes, etc., the osteopathic treatment afforded marked relief. In this group of cases comparative studies again have not been made, but one is forced to the conclusion, from the great weight of evidence of relief in isolated cases, that benefit is frequently derived by these manipulations. In other instances osteopathic manipulations have resulted in harm to the patient. Your committee endeavored to figure out what actually happens in these cases in which relief is obtained, for the osteopaths only have a theory as to the cause of the relief, and this theory varies among different osteopaths. A regular physician who has made considerable study of this subject feels that the various theories of the osteopaths do not quite account for the results obtained and offers a different one of his own. Your committee has not arrived at a satisfactory conclusion as to the reason for the beneficial results and feels that at present the reasons are not known. It feels that careful study should be conducted by properly trained medical investigators in order to arrive at the truth in regard to these results.

Your committee in conclusion feels, therefore, that the therapeutic agent known as osteopathy has not been proved to be of any value in the diseases of known pathology. It has been shown to be of undoubted benefit in certain conditions of unknown pathology. It is also well known that it can do harm in various conditions, especially when applied without a general medical knowledge. Your committee urges the Society, therefore, to join with other medical research forces in the State in an effort to clear up the points mentioned above which have not been, as yet, definitely settled in regard to osteopathy, and to find out in what way osteopathy helps in those very few conditions in which it seems to be of value, in order that this therapeutic agent may be used intelligently by the profession at large. For this purpose funds should be appropriated.

CHIROPRACTIC

Chiropractic apparently was founded by a layman and, like osteopathy, depends upon a theory. This theory consists in the claim that all disease results from pressure upon nerves as they emerge from the spinal canal. This pressure is caused by abnormal position of the vertebrae. The chiropractor does not need the accumulated knowledge in regard to disease because if pressure is relieved from the nerve roots, health will result irrespective of the type

of the disease. One of their leaders, Palmer, says in his writings that he does not want a diagnosis.

In support of this theory your committee has been unable to find any experimental or other sound evidence, either in the chiropractic literature or elsewhere. To substitute this unproved theory for the accumulation of medical knowledge is, of course, absurd.

Your committee is not convinced that the leaders in chiropractic are sincere and feels that the whole subject may be one gigantic fraud in which a certain number of sincere individuals have been carried along. The only possible value that your committee can find in chiropractic is that it may offer a new therapeutic agent which will be of value in certain cases, and therefore your committee has endeavored to investigate the method of procedure used by the chiropractors and study their results.

The procedure of the chiropractor is to examine the spine by palpation and x-rays in order to locate the subluxations or other malpositions of the vertebræ. In addition attempt is made to trace the course of nerves over the trunk, head and extremities for tender points. The chiropractor claims that abnormal positions of certain vertebræ, with resulting pressure on certain nerves, account for the various disorders known to medicine. Their treatment consists in an attempt to reduce by manipulation these subluxations or malpositions of the vertebræ.

Your committee can find from the chiropractic literature or elsewhere no sufficient evidence that this form of treatment is of any value in disease of recognized pathology. Individual reports on the results of chiropractic treatment in this community are so few that your committee could not find any evidence that this type of treatment is of value in those ill-defined disorders of unknown pathology in which osteopathy is at times of benefit. The tremendous growth of the cult throughout the United States is the one reason for wondering whether in certain ill-defined conditions chiropractic treatment may be of comfort, if not of benefit, to the patients. This point, however, is not proved at the present time and it is quite probable that if any benefit is derived from the use of chiropractic treatment it is the result of suggestion rather than the treatment.

Your committee feels, therefore, in regard to chiropractic that at the most it can only be looked upon as a therapeutic agent in the group of physical therapeutic agents. Your committee feels certain that to employ such a therapeutic agent without general medical knowledge is a great danger to the public health. Your committee urges that the Society include in its investigation of the benefits derived from osteopathy the claims of the chiropractors in

order to see if it offers a therapeutic agent worthy of consideration by the medical profession.

Among the various books and pamphlets consulted are the following:

OSTEOPATHY

Burns, L. J.: Basic principles of Osteopathy.

Clark, M. E.: Applied Anatomy.

McConnell and Teall: Practice of Osteopathy.

Riggs: Manual of Osteopathic Manipulation and Treatment.

Still, A. T.: Research Institute, Bulletin No. 1.

Research Institute, Bulletin No. 2.

Research Institute, Bulletin No. 4.

Research Institute, Bulletin No. 5.

Taskar, D. L.: Principles of Osteopathy.

Woodall, P. H.: Manual of Osteopathic Gynecology.

CHIROPRACTIC

Encyclopedia Americana.

Firth, J. M.: Chiropractic Symptomatology.

Loban, J. M.: Technique and Practice of Chiropractic.

McNamara, R. E.: Chiropractic.

Palmer, B. J.: Science of Chiropractic: Vols. II, III, and VI.

Sterns: Methods of Examination.

Vedder, H. E.: Chiropractic Physiology.

RECOMMENDATIONS

Your committee appointed to investigate Osteopathy and Chiropractic during its work became convinced that the Society owes a duty to the general public in regard to enlightening the public how to handle the growth of medical cults, and therefore has taken the liberty to present to you the following suggestions with the hope that some action will be taken upon them if you see fit.

Your committee feels that the proper way to handle the cult problem, which will always continue to crop up, is to avoid intolerance against the practitioners of these methods, and to educate the public, and especially the legislators, that these cults are in reality simply therapeutic agents. It should then be made clear that all those using any therapeutic agent in the care of the sick should only do so provided that they possess an adequate general medical knowledge, based upon a uniform examination such as the Massachusetts law calls for at present. The Massachusetts Medical Society should always be active in trying to raise the standards of this examination.

CHANNING FROTHINGHAM, *Chairman*.

GEORGE C. BADGER.

JAMES W. SEVER.

MISCELLANEOUS

FOURTH OF JULY ADDRESS*

BY PROF. ADOLF LORENZ

Vienna

Allow me to introduce myself as a man who has been asked many hundred times, "How do you like America?" and who always has answered, "I like America very much, indeed." I consider the celebration of the fourth of July, 1922, in Baden as a landmark for times to come and I sincerely hope that the line of celebrations will never again be broken.

It is a long time since I attended the last fourth of July celebrated by Americans in this country. It seems to me a century—at least one should think that a whole century would scarcely be long enough to bring about what five years of cruel warfare have done to the welfare and civilization of this world racked to its foundations. To restore these foundations it is absolutely useless to inquire after the final causes of the terrible catastrophe by which mankind has been overtaken, in order to lick the pretended culprit.

Let us rather humbly confess that, in spite of all civilization, man is and will be a fighting animal, not better, most likely worse, than the other creatures on God's earth. But even fighting animals know reconciliation. At least in this respect, the fighting animal man should be better than the fighting beasts.

One way or another, the war must be forgotten in our hearts, for it is over. Let us consider it as a hurricane, a thunderstorm which is bound to come once in a while—even in spite of the Washington conference for limitation of armament—to clear up a hazy atmosphere. Has it been our duty to fight in war time, it is not less our duty to promote conciliation after the war has come to an end. The world simply can't go on quarreling or there would be no victors but only defeated in the end, which, by the way, seems to be the case anyhow.

In this conciliatory work, the medical profession, in my opinion, has to perform a leading part. The medical profession, which is or should be as cosmopolitan as human sufferings doubtless are, should give an example of reconciliation to the people.

The medical profession is bound to acknowledge that the world-saving remedy is a healing dose of "forgetting" and a stimulating, vivifying dose of "forgiving." The medical profession should ceaselessly fight only one war—the war against the diseases of humanity, the common foe of all the nations. This war should be an ennobled war consisting of the keen competition to excel in endeavors to benefit suffering mankind.

To fight this war successfully, you have again come to old Vienna. She has ceased to be a political metropolis, but it will be her pride and exertion to remain a metropolis of art and science, especially of medical science, in all the future. Art and science, refined industry and the wonderful geographical situation, by which she is destined to remain in the future, as she was in the past, the commercial mediator between West and East, are the four items by which the rise of old Vienna out of her ashes is guaranteed. But at the present time Vienna is very badly off.

I congratulate you on having ventured to come to our impoverished city in spite of fear to go to bed with an empty stomach for you well know that an empty stomach does not make you feel any better even if the brain has been filled to the brim with ethereal scientific food. The same, I congratulate the ladies, who have ventured to come with you, guarding your health and good conduct. Luckily the American dollar has settled the stomach question for you. But do not tell at home that that part of the Viennese people to whom the old glory of Vienna as a metropolis of science and art is due—I mean the middle class of people, especially the brain workers—are living luxuriously. Such a tale would be erroneous from the beginning to the end. Whoever has come in touch with this class of the people, and you have, knows better. The value of the Austrian crown tells the story. To owners of Austrian crowns prices are prohibitive, but we won't despair.

I take this first celebration of the fourth of July after the war as a good omen in assuming that old Vienna, though she may at present have lost part of her external and all of her internal beauty, will again be what she was in pre-war times, the holy shrine of medical research and teaching, attracting medical pilgrims from all parts of the world, especially America.

I hope that you will not regret to have come to us as the first pioneers! I hope you will tell at home that our arms are open to welcome you in our wretched country and that we did our best to make you feel at home with us. I am sure that you celebrate this fourth of July with the same elated hearts as if you celebrated it at home instead of in a foreign country.

Although you have no crackers, no guns, no powder nor other implements to make noise with, I envy you and all Americans such celebrations. Your independence brought home from the battlefields meant to the American people to do, and to leave undone, what they themselves thought best for themselves. Compare with it our independence also brought home from the battlefields! It is an independence imposed, enforced upon us to do or to leave undone, not what we, ourselves, but what other people

*Delivered at the July 4th celebration at Baden, 1922.

think best that we should do or leave undone. Our independence is the liberty—to die. May God Almighty grant our wretched country a time when it will celebrate its independence in the American sense!

Ladies and gentlemen, excuse this excursion, but it imperatively imposed itself upon me at this occasion. Finishing my remarks, let me hail you ladies and gentlemen as missionaries of reconciliation and peace when you return to your country and let me join you as your faithful collaborator when I shall pay my next visit to your shores next fall.

I have to add something! When I said in the introduction that I liked America very much, indeed, I have to make a restriction in the end. To tell the truth, I did not like at all the American climate, whether in the East or in the West, whether in your mountains or on your plains. The American climate affected my health very badly when I had to stand it last winter. It did not affect my health at all when I visited America nearly twenty years ago. At that time it still had a healthful climate. In the meantime it must have changed for the worse. The New York climate is especially bad, as you know. It nearly killed me last winter. In my plight, I consulted a famous physician. His diagnosis was nervous breakdown, due to overwork. I was in despair. At last, I remembered that I am a specialist, myself, quite especially of the hip joint. You are aware of the fact that specialists are used to look at the world through their own eye-glasses. So did I. I guessed that something must be the matter with my hip joint, which seemed to creak a little when in motion. I resolved at once to apply a cataplasm in the shape of a flat bottle of whiskey, which I put in my hip pocket. From then on I got better, day by day. The vapors of the whiskey not only benefited the hip joints but my whole system. They changed the American climate, which obviously was too dry for me. I felt very proud to have found such an effective remedy to help all those who suffered from the dryness of the American climate. I even thought of having the whiskey cataplasm of the hip joint patented but I learned very soon that I had come too late, that many thousand Americans, suffering from the dry climate, carry a cataplasm in the form of a flat bottle of whiskey on the hip. But I will improve. The next time I will try to be and to remain a law-abiding citizen. As an old man, who is supposed to be a wise man, too, I have to make preparations for my next trip to America. I will get as dry as an Egyptian mummy. I shall be able to stand not only the dryness of your deserts but also the dryness of Manhattan Island. To begin with, I fill my glass with pure "dry" liquid, giving you a good example, but assuring you at the same time that I do not intend to denounce you at home for your obvious liking of our light and wholesome Austrian wines.

I raise my glass with its lawful contents and invite you to join me in three cheers to the only remedies to this shattered world: Oblivion and Collaboration!

Editor's Note—Professor Lorenz' address appears exactly as he read it, the editor feeling that the address would be of greater interest if his prerogatives were waived.

OBITUARY

ALEXANDER RIGHTER CRAIG

Dr. Alexander Righter Craig, secretary of the American Medical Association since 1911, died suddenly on September 2, 1922, while on his vacation.

Dr. Craig was born in Columbia, Pennsylvania, July 31, 1868, the son of Dr. Alexander Craig. He received his academic degree from Franklin and Marshall College, Pennsylvania, in 1890, and his M. D. from the University of Pennsylvania in 1893. Returning to his home town, the doctor practiced there from 1895 to 1906, when he moved to Philadelphia, where he continued practice until 1911.

Dr. Craig served Pennsylvania continuously in the House of Delegates from 1903 to 1910, and was a member and chairman of many important committees; he was chairman, at three different sessions, of the Committee on Amendments to the constitution and by-laws and chairman of the Committee on Reports of Officers in 1909.

At the Los Angeles session, Dr. Craig was elected secretary of the American Medical Association, a position which he admirably filled until his untimely death. It is said that Dr. Craig looked upon his chosen work in the organized profession in the nature of a calling and his energy and ability in the many phases of association work are well known. Active in religious and social work, Dr. Craig's religion was carried into his life work, which accounts for the fact that "he was universally loved, a man with never a harsh word, calm, self-effacing, reticent, and withal a marvel of efficiency in his chosen work."

JOHN J. EKLUND

Dr. John J. Eklund of Duluth, Minnesota, was shot and instantly killed in his office the morning of August 19, 1922. His insane assailant immediately suicided. This tragic result of allowing anyone to carry concealed weapons has robbed our profession of one of its foremost members.

Dr. Eklund was Swedish born, coming to America with his parents when about five years old and residing with them at Taylor's Falls, Wisconsin. Later they lived at Cambridge, Minnesota, where he attended the elementary schools. He was one of the early students at Gustavus Adolphus College, and one of its best known graduates. He always referred to its early moral and intellectual atmosphere with the greatest appreciation. His collegiate training and associations greatly assisted him later in becoming an unusual influence for good among his Swedish-American countrymen; it was the foundation for his wise political and social counsel.

He graduated in medicine in 1885 from the old Minnesota College Hospital, an institution that became one of the earliest affiliations of the medical department of the University of Minnesota. He settled at once in Duluth. November 7, 1883, he married Miss Nannie Asp, of St. Peter. They had one son, William. Mrs. Eklund died in 1905.

Few men ever coped more seriously with an ever increas-

ing practice that yielded him heavy responsibilities and little leisure. His charitable trend and never failing sympathy soon brought him a following among all classes, and in later years a very large surgical clientele.

It has fallen to the lot of few physicians to receive the degree of public confidence accorded Dr. Eklund. This, combined with unusual political sagacity and business judgment, gave him a very high position in the councils of his chosen party (Republican), and a directorate in several banks and business enterprises. Thus he became a physician who reflected the very highest credit upon his profession. Of foreign birth, he himself attained and assisted thousands of others of our great Scandinavian population, to reach the highest type of citizenship, the truest and finest Americanism.

For himself he asked little political preferment. Some years ago he accepted the office of coroner of St. Louis County, hardly a lucrative position, and during the war he was chairman of the Fourth District Exemption Board.

At his death he was chief of staff of St. Luke's Hospital, showing in this position great surgical capacity. He was president of the Duluth National Bank, and a director in the Northern National Bank, an illustration of his keen business enterprise. He was also a member of many civic and social clubs, reflecting his broader general interests. He had received many honors at the hands of his professional brethren; for example, the presidency of the St. Louis County Medical Society. He was also a Fellow of the American College of Surgeons.

Of his immediate family he leaves to mourn him besides his son and associate, Dr. William J. Eklund, a brother, N. C. Eklund, residing in Montana; two sisters, Mrs. J. D. Olson, of Minneapolis, and Mrs. Mary Engdahl, of Ortonville, Minnesota; also a niece, Miss Nathalie Asp, who resided with him for some years.

DR. JOHN EMMETT RHEIM

Dr. John Emmett Rheim, for the past seven years practicing physician at Mora, Minnesota, died suddenly Sunday morning, July 30, at Mille Lacs Lake, where he and his wife with several other families were camping.

Dr. Rheim had been ill for some time but following a successful operation in a Minneapolis hospital was reported as recovering rapidly. His sudden death at the cottage where he and Mrs. Rheim had gone for an outing was a distinct shock to every one who knew him.

John Emmett Rheim was born at Missoula, Montana, January 1, 1885. He graduated from the Butte, Montana, high school in 1906 and then took up the study of medicine at the Northwestern University Medical School in Chicago, from which he obtained his degree in 1910 and began practice at Knife River and Duluth, Minnesota. In 1913 Dr. Rheim moved to Graston. It was here that he met Miss Stella Peterson, who became Mrs. Rheim, January 2, 1915. In October of that year Dr. Rheim moved to Mora and established his home and practice there.

Dr. Rheim was held in the highest esteem in Kanabec county, where he served as county coroner and health officer for the village of Mora. He also served two terms as mayor of Mora. His outstanding characteristics were honor,

integrity and fairness. His reputation as a physician was an enviable one and he leaves many friends in all walks of life to mourn his untimely death.

DR. H. N. McDONALD

Dr. H. N. McDonald, who had been a practicing physician in Minneapolis for the past thirty-three years, died at his home, 901 Fourth Street Southeast, Saturday, July 22.

Dr. McDonald was born fifty-nine years ago in Gengarry, Ontario, and graduated from McGill University in 1889, coming to Minneapolis to start his practice the same year. He married Miss Christine McLeod of Minneapolis in 1894.

He was prominent in club organizations as well as in a professional way, being a member of Cataract lodge, Masonic order, a Scottish rite member and also a member of Zurah temple. He belonged to the Minneapolis Athletic Club and was a charter member of the St. Anthony Falls club.

Dr. McDonald is survived by his wife and two daughters, Mrs. Hart Anderson and Miss Isabel McDonald, a sister and a brother, Dr. D. M. McDonald of the Minnesota State Sanitary Board, St. Paul.

A man of steadfast character and likable personality, Dr. McDonald has left an influence among medical men and other associates which will not be forgotten.

DR. J. P. CALDWELL

Dr. J. P. Caldwell, a practicing physician of St. Paul, Farmington, Lakeville and Princeton, Minnesota, died September 7 at his home, 1446 West Minnehaha avenue, St. Paul, at the age of 74 years.

Dr. Caldwell was born at Manchester, Illinois, January 23, 1848, and came to Lakeville 40 years ago. He had been a resident of St. Paul for the past 25 years but discontinued active practice 20 years ago.

Dr. Caldwell served with the 113th Illinois Volunteers in the Civil War and was active in the G. A. R. He took an active part in the campaign for William R. Merriam for governor and for a time was secretary to Senator Moses E. Clapp at Washington.

Dr. Caldwell is survived by his widow, four sons, three of whom are practicing physicians in St. Paul, and a daughter.

DR. FREDERICK A. KNIGHTS

Dr. Frederick A. Knights of Pequot, for eleven years a practicing physician of Minneapolis, died at St. Joseph's hospital, Brainerd, Minnesota, following an illness of several months.

Dr. Knights was born in Illinois, August 23, 1861. He was graduated from the Northwestern University Medical School in Chicago in 1890. Following his practice in Minneapolis he moved to Pequot on account of ill health and had been in business in the latter town for the past nine years.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

MINNESOTA STATE MEDICAL MEETING

The annual meeting of the Minnesota State Medical Association is scheduled for Thursday, Friday and Saturday, October 12, 13, and 14, 1922, at the University of Minnesota in Minneapolis. The Council will meet at 10 a. m., October 12, and the House of Delegates at 2 p. m., October 12, at Millard Hall. Registration headquarters will also be at Millard Hall.

The Ladies' Auxiliary of the Hennepin County Medical Society will supervise information booths at the Curtis Hotel, Radisson Hotel, and Millard Hall. Information will be obtainable at the rooms of the Hennepin County Medical Society in the Donaldson Building, Minneapolis, at any time during the convention.

There will be telephone accommodations furnished in all University buildings and long distance calls will be put through the University of Minnesota central by way of the Physicians' Exchange booth only. This booth will be next the registration booth in Millard Hall.

The scientific meetings will occupy Friday and Saturday, October 13 and 14. The medical section will hold its meeting in the Engineering building and the surgical section in the Anatomy building. The joint meeting Friday afternoon will be held in the Engineering building. There will be a short joint session at 2 o'clock Saturday afternoon also.

Clinics for visiting doctors will be held all day Thursday in the various hospitals in Minneapolis. Information regarding these clinics can be obtained Wednesday evening after 6 o'clock and Thursday at the Hennepin County Society headquarters. Dr. A. T. Mann has general supervision of the clinics.

Visiting doctors and ladies may procure cards for the various golf courses in the Twin Cities by applying at the registration desk. Dr. H. N. Newhart, 910 Donaldson Bldg., chairman of the entertainment committee, has charge of golf arrangements.

Physicians and their ladies are invited to the annual banquet which will be held at the Curtis Hotel at 7 o'clock Friday evening. Some lay speaker of note will address the members following a banquet and special entertainment, to be provided. Dr. G. Elmer Strout is chairman of the banquet committee. Visiting ladies are invited to meet at 11 o'clock on Thursday at the Curtis Hotel, where transportation will be furnished for the luncheon to be given by the Ladies' Auxiliary of the Hennepin County Medical Society at the Minneapolis Automobile Club house.

Exhibits will consist of the following:

1. Commercial exhibits in the corridors of Millard Hall and the Institute of Anatomy. Dr. S. R. Maxeiner has charge of these exhibits.

2. Scientific exhibits consisting of x-ray demonstrations, pathological material, etc. Physicians throughout the state are urged to send in material for this exhibit and should communicate with Dr. K. Ikeda, Minneapolis General Hospital, chairman of this committee. Where a roentgen

opinion is desired, the committee in charge will take particular pains to obtain it from visiting specialists for the benefit of inquiring participants. Each film must be labeled showing name of exhibitor, diagnosis and, where desirable, a brief history. Films should be sent directly to the x-ray committee, care of Dr. E. T. Bell, Department of Pathology, University of Minnesota, Minneapolis.

3. Demonstrations by the departments of Pathology, Bacteriology, Pharmacology, Physiology and Experimental Surgery.

Following appears a list of local committees:

Committee on Arrangements—Dr. E. L. Gardner Chairman; Dr. Horace Newhart, Dr. J. C. Litzenberg, Dr. W. R. King, Dr. A. T. Mann, Dr. Nimrod Johnson, Dr. P. W. Giessler, Dr. A. E. Smith, Dr. A. F. Schmitt.

Committee on Exhibits—Dr. S. R. Maxeiner, Chairman; Dr. J. B. Carey, Dr. S. M. White.

Scientific—Dr. E. T. Bell, Dr. J. S. McCartney, Dr. W. A. O'Brien, Dr. C. M. Jackson.

X-Ray—Dr. K. Ikeda, Chairman; Dr. R. W. Morse, Dr. F. H. K. Schaaf, Dr. A. W. Desjardins, Dr. T. R. Martin.

Commercial—Dr. S. R. Maxeiner, Chairman; Dr. F. J. Souba, Dr. H. M. Lee.

Committee on Banquet and Entertainments—Dr. G. E. Strout, Chairman; Dr. O. S. Wyatt, Dr. C. E. Willcutt, Dr. F. J. Souba, Dr. Ivar Sivertsen, Dr. T. H. Sweetser, Dr. L. M. Lajoie, Dr. E. R. Hare, Dr. E. D. Anderson.

Committee on Hotel Accommodations—Dr. G. E. Benson, Dr. G. E. Thomas.

Committee on Publicity—Dr. A. E. Smith, Chairman; Dr. W. A. Jones, Dr. C. B. Drake.

Important! The National Dairy Show is to meet in Minneapolis, October 7 to 14 inclusive. Visiting physicians should therefore make their hotel reservations as soon as possible either directly or by communicating with Dr. E. L. Gardner, 730 LaSalle Bldg., or Dr. S. G. Reynolds, 816 LaSalle Bldg., Minneapolis.

The following papers will be read:

MEDICAL SECTION

The Training of the Laboratory Technician—Dr. Walter E. King, St. Paul.

Bilateral Induced Pneumothorax—Dr. Everett K. Geer, St. Paul.

The Relation of the General Hospital to the Tuberculosis Sanatorium—Dr. A. T. Laird, Nopeming.

Non-Specific Irritation: A Precipitating Cause of the Anaphylactic Diseases of Infancy and Childhood—Dr. W. Ray Shannon, St. Paul.

The Present Status of Medical Opinion Concerning the Nature, Diagnosis and Prognosis of Encephalitis Epidemica—Dr. Charles R. Ball, St. Paul.

Chronic Intestinal Indigestion in Infancy and Early Childhood—Dr. Rood Taylor, Minneapolis.

Treatment of Duodenal Ulcer—Dr. Hugh S. Willson, Minneapolis.

The Value of Routine Coagulation and Bleeding Time in New Born Infants—Dr. Margaret Warwick, St. Paul.

Diagnosis of Uterine Malignancy—Dr. O. C. Melson, Rochester.

Status Thymico-Lymphaticus in Infancy—Dr. Carl O. Kohlbr, Duluth.

The "Local" Wassermann Reaction: A New Diagnostic Aid in Primary Syphilis—Dr. H. Rypins and Dr. D. Stern, Minneapolis.

Importance of a Longer Period of Rest in Bed with Medical Supervision, in order to Prevent Heart Lesions Following the Infectious Diseases—Dr. Walter R. Ramsey, St. Paul.

Milk Transmission of Pollen Hay Fever—Dr. Edgar T. Hermann, St. Paul.

Diseases Associated with Pernicious Anemia—Dr. H. Z. Giffin and Dr. J. P. Bowler, Rochester.

Standardization of Laboratories and Technicians—Dr. Kano Ikeda, Minneapolis.

The Value and Importance of Blood Chemistry in Clinical Medicine—Dr. Moses Barron, Minneapolis.

Handling of Heart Diseases in Children—Dr. Max Seham, Minneapolis.

Some Unusual Postoperative Pulmonary Complications—Dr. Norman M. Keith, Rochester.

The Clinical Diagnosis of Gastric and Duodenal Ulcer—Dr. O. J. Hagen, Moorhead.

The Psychopathic Hospital—Dr. Arthur S. Hamilton, Minneapolis.

Significant Changes in Heart Outline Following Rational Treatment—Dr. Charles L. Greene, St. Paul.

Myxedema—Dr. H. S. Plummer, Rochester.

Life Insurance Medicine—Dr. H. W. Cook, Minneapolis. Strophanthus: Kombe Laboratory and Clinical Considerations—Dr. R. A. Morris, St. Paul.

Observations and Experiences on Six Hundred Duodenal Drainages—Dr. C. P. Robbins, Winona.

Tuberculous Peritonitis—Dr. A. C. Baker, Fergus Falls.

SURGICAL SECTION

Diaphragmatic Hernia—Dr. A. T. Mann, Minneapolis.

Pancreatic Cysts—Dr. H. A. Bouman, Minneapolis.

Subject to be announced—Dr. W. A. Sistrunk, Rochester.

Dysmenorrhea—Dr. J. S. Rothrock, St. Paul.

Injuries to the Lower Birth Canal—Dr. J. R. Manley, Duluth.

A Review of One Hundred Fifty-three Cases of Bladder Stone Removed by Lithotrity—Dr. J. S. Crenshaw, Rochester.

Diagnosis and Treatment of Ureteral Stone—Dr. G. J. Thomas, Minneapolis.

Surgery of Acute Gallbladder Conditions—Dr. E. S. Judd, Rochester.

Motion Pictures and Animated Drawings Illustrating the Application of Local Anesthesia—Dr. R. E. Farr, Minneapolis.

Preoperative Preparation of Patients with Obstructive Jaundice—Dr. Waltman Walters, Rochester.

Traumatic Rupture of the Spleen: Report of Seven Cases—Dr. E. C. Robitshek, Minneapolis.

Diverticulitis of the Colon—Dr. J. T. Rogers, St. Paul. Essentials in the Treatment of Peritonitis—Dr. Donald Bacon, St. Paul.

The Causes, Repair and Management of Postoperative Abdominal Hernia—Dr. A. E. Benjamin, Minneapolis.

Cerebral Pneumography as an Aid in the Early Diagnosis of Hydrocephalus—Dr. O. S. Wyatt, Minneapolis.

Heliotherapy in Infectious Diseases of the Bones and Joints—Dr. Emil Geist, Minneapolis.

Surgical Treatment of Infantile Paralysis—Dr. M. S. Henderson, Rochester.

Pseudo-neuritis or Irritable Conditions Following Injury—Dr. A. E. Wilcox, Minneapolis.

Congenital Pyloric Stenosis—Dr. A. C. Strachauer, Minneapolis.

The Use of Nerve Block Anesthesia in General Surgery—Dr. W. R. Meeker, Rochester.

A Study of the Tonsil Question with a Preliminary Report of X-Ray and Radium Therapy in the Treatment of Pathologic Tonsils—Dr. Laura Lane, Minneapolis.

Some Important Features in the Diagnosis and Operative Treatment of the Sinuses—Dr. H. A. Beaudoux, Minneapolis.

MISSISSIPPI VALLEY MEDICAL ASSOCIATION

OFFICERS

President—Charles E. Barnett, M. D., Ft. Wayne, Ind.

First Vice President—William Engelbach, M. D., St. Louis, Mo.

Second Vice President—John DeJ. Pemberton, M. D., Rochester, Minn.

Secretary—Henry Enos Tuley, M. D., Louisville, Ky.

Treasurer—S. C. Stanton, M. D., Chicago, Ill.

Chm. Com. Arrangements—Robert D. Mussey, M. D., Rochester, Minn.

The annual meeting of the Mississippi Valley Medical Association, whose membership includes physicians throughout the United States and Canada, will be held at Rochester, Minnesota, October 10, 11, and 12, 1922.

This meeting is scheduled for the three days immediately preceding the Minnesota State Medical Association meeting, thus affording the unusual opportunity for members of the profession to attend both meetings. A Genito-Urinary Symposium will be opened by Dr. Frank Kidd of London, England, and promises to be of unusual interest.

Headquarters will be at the Kahler Hotel, Rochester, and reservations should be made early to Dr. P. P. Vinson, Chairman of the Hotel Committee, Rochester, Minnesota.

Following is the preliminary program:

President's Address—Kidney Metabolism—Chas. E. Barnett, Fort Wayne, Ind.

Oration in Medicine—Stewart R. Roberts, Atlanta, Ga.

Oration in Surgery—William C. Quinby, Boston, Mass.

George V. I. Brown, Milwaukee, Wis.—Report of the Result of Continuous Experience in the Surgical Operative Treatment of Cleft Palate.

B. C. Corbus, Chicago, Illinois—The Treatment of Tumors of the Bladder by Thermo-Electric Coagulation.

Leo M. Crafts, Minneapolis, Minn.—Epidemic Encephalitis—Its Widely Variant Syndromes.

C. W. Dowden, Louisville, Ky.—A Report on the Animo-Acid Content of Human Blood.

Joseph Rilus Eastman, Indianapolis, Ind.—Safety in Drainage of Intra-Abdominal Abscesses.

Charles P. Emerson, Indianapolis, Ind.—The Vascular Element in Cardiovascular Renal Disease.

W. D. Haines, Cincinnati, Ohio.—The Surgical Management of Goiterous Patients.

Preston M. Hickey, Ann Arbor, Mich.—The Consideration of Some of the Infections of the Sacroiliac Joint as an Explanation of Lower Back Pains.

W. Stuart Leech, Roseau, Minn.—The Pineal Gland and the Condition of the Ego During Sleep.

Angus McLean, Detroit, Mich.—Thromboses—Etiology and History—Percentage of Cases Following Operation, the Relation of the Thrombi to Emboli—Subsequent Effects of Emboli, Lantern Demonstrations.

Frank P. Norbury, Jacksonville, Ill.—The Economics and Mental Hygiene of Neurosyphilis.

F. M. Pottenger, Monrovia, Calif.—The Nature and Cause of Visceral Pain: Illustrated by Pain Arising in the Lung and Pleura.

J. S. Pritchard, Battle Creek, Mich.—The Value of Rest in Cases of Pulmonary Abscess and Empyema.

Willard C. Stoner, Cleveland, Ohio.—Modern Diagnosis of Disease versus Modern Treatment.

J. L. Tierney, St. Louis, Mo.—Diagnostic Signs of Endocrine Disease.

Willis Walley, Jackson, Miss.—The Importance of Clinical Diagnosis in Surgery of Stomach, Gallbladder and Appendix.

Frank T. F. Stephenson, Detroit, Mich.—Observation on Use of a Reptilian Tubercle Bacillus in Tuberculosis.

Symposium on Genito-Urinary Diseases.

DODGE COUNTY MEDICAL SOCIETY

The Dodge County Medical Society held its eighteenth annual meeting at the picnic grounds north of Dodge Center, Friday, September 1. With the exception of one, all members of the society were present, who with their families made an attendance of forty.

Officers re-elected for the ensuing year are: Dr. E. E. Harrison, West Concord, president; Dr. W. E. Belt, Dodge Center, vice president; Dr. C. E. Bigelow, Dodge Center, secretary-treasurer.

The society passed a resolution condemning legislation hostile to the present standards of medical practice in Minnesota and a committee was appointed to obtain information upon the subject.

SOUTHWESTERN MINNESOTA MEDICAL SOCIETY

The Southwestern Minnesota Medical Society will hold its semi-annual meeting at Windom, October 26. Election of officers and a report by the committee on "Public Policy and Legislation" with a program of papers will comprise the meeting. A banquet has been planned to be served at 6 o'clock. The society sends a cordial invitation to all visitors who would like to attend.

RAMSEY COUNTY MEDICAL SOCIETY

The Ramsey County Medical Society held its first fall meeting September 25th. Papers were read by Dr. J. T. Christison and Dr. T. L. Birnberg.

The Ramsey County Medical Society will hold its third annual "Clinic Week," January 9, 10, 11, 12 inclusive, 1923.

TRI-STATE DISTRICT MEDICAL ASSOCIATION

Comprising Entire States of Iowa, Illinois and Wisconsin and Districts of Surrounding States

The annual assembly of the Tri-State District Medical Association is to be held in Peoria, Illinois, October 30, 31, November 1 and 2. The entire time of the assembly will be taken up with scientific addresses, essays and diagnostic clinics. Minnesota physicians are most cordially invited to attend and hotel reservations should be made early by communicating with Dr. Wm. B. Peck, managing director, Freeport, Illinois.

Following is a partial list of eminent men of the profession who will take part in the program:

Dr. Alfred W. Adson, Mayo Clinic, Rochester, Minnesota.
Dr. William Seaman Bainbridge, New York, N. Y.

Dr. Frank Billings, Prof. of Medicine, Rush Medical College, School of Medicine, Chicago, Illinois.

Dr. Ernest S. Bishop, Clinical Prof. of Medicine, New York Polyclinic Medical School, New York, N. Y.

Dr. Francis G. Blake, Prof. of Medicine, Head of Department of Medicine, Yale University, School of Medicine, New Haven, Conn.

Dr. Walter W. Chipman, Prof. of Obstetrics and Gynecology, University of McGill, Faculty of Medicine, Montreal, Canada.

Dr. John G. Clark, Prof. of Gynecology, University of Pennsylvania, School of Medicine, Philadelphia, Pa.

Dr. Lewis A. Conner, Prof. of Medicine, Cornell University, School of Medicine, New York, N. Y.

Dr. George W. Crile, Prof. of Surgery, Western Reserve University, School of Medicine, Cleveland, Ohio.

Dr. John B. Deaver, Prof. of Surgery, University of Pennsylvania, School of Medicine, Philadelphia, Pa.

Dr. Charles A. Elsberg, Prof. of Clinical Surgery, University and Bellevue Hospital, Medical College, New York, N. Y.

Dr. John M. T. Finney, Prof. of Clinical Surgery, Johns Hopkins University, Medical Department, Baltimore, Md.

Dr. Andrew Fullerton, Belfast, Ireland.

Dr. John H. Gibbon, Prof. of Surgery and Clinical Surgery, Jefferson Medical College, Philadelphia, Pa.

Dr. William D. Haggard, Prof. of Surgery, Vanderbilt University, School of Medicine, Nashville, Tenn.

Dr. Charles F. Hoover, Prof. of Medicine, Western Reserve University, School of Medicine, Cleveland, Ohio

Dr. August Frederic Jonas, Prof. of Surgery, University of Nebraska, School of Medicine, Omaha, Nebr.

Dr. Allen B. Kanavel, Prof. of Surgery, Northwestern University, School of Medicine, Chicago, Illinois.

Dr. Einar Key, Riddaregatan 1, Stockholm, Sweden.

Dr. Robert W. Lovett, Prof. of Orthopedic Surgery, Harvard University, School of Medicine, Boston, Mass.

Dr. Charles F. Martin, Prof. of Medicine, McGill University, Faculty of Medicine, Montreal, Canada.

Dr. William J. Mayo, Mayo Clinic, Rochester, Minnesota.

Dr. John Lovett Morse, Prof. Emeritus of Pediatrics, Harvard University, School of Medicine, Boston, Mass.

Dr. Joseph A. Pettit, Prof. of Surgery, North Pacific College, Portland, Oregon.

Dr. George M. Piersol, Prof. of Medicine, University of Pennsylvania, School of Medicine, Philadelphia, Pa.

Dr. Alexander Primrose, Dean and Prof. Clinical Surgery, University of Toronto, Faculty of Medicine, Toronto, Canada.

Dr. Emmett Rixford, Prof. of Surgery, Leland Stanford Junior University, School of Medicine, San Francisco, California.

Dr. Greenfield Sluder, Prof. of Laryngology and Rhinology, Washington University, School of Medicine, St. Louis, Mo.

Professor Theodor Tuffier, Paris, France.

Dr. John A. Witherspoon, Prof. of Medicine, Vanderbilt University, Medical Department, Nashville, Tenn.

OF GENERAL INTEREST

Dr. A. D. Cornica of the Earl Clinic, St. Paul, has moved to Centerville, Iowa.

Dr. G. L. Baker of Austin has recently moved his practice to Rib Lake, Wisconsin.

Dr. G. Van Beck of Hastings has located in Mazeppa, where he will practice medicine.

Dr. and Mrs. C. A. Undine of Minneapolis are receiving congratulations on the birth of a son.

Dr. A. E. Williams, formerly of Backus, Minnesota, is now located at Fall Creek, Wisconsin.

Dr. and Mrs. J. E. Crewe of Rochester have returned from a camping trip north of Brainerd.

Dr. James F. Lynn of Waseca is running for the office of congressman from his district this fall.

Dr. G. Schmidt and family of Lake City have returned from a trip of several weeks through the east.

Dr. F. W. Whitmore and Dr. W. R. Shannon are now occupying Suite 323 in the Lowry building, St. Paul.

Dr. Frank H. Gunn, formerly of Baudette, has opened his office at Fortieth street and Central avenue, Minneapolis.

Dr. Paul F. Brown of Minneapolis has been appointed Chief Surgeon in the U. S. Veterans' Hospital, No. 76, at Chicago.

Dr. William Gamble of Minneapolis has moved to Albert Lea where he will establish his practice of medicine and surgery.

Dr. E. C. McGehee of the Rood Hospital staff, Hibbing, has left for Greasy Creek, Ky., where he will take up his practice.

Dr. and Mrs. E. Bratrud of Warren recently returned from a two weeks' outing at Detroit. The trip was made by motor.

Dr. G. L. Merkert of Minneapolis is now located in his new office at 1527 East Lake street, which was recently remodelled.

Dr. Thomas Myers of St. Paul is in the East taking postgraduate work in pediatrics at Chicago, New York and Baltimore.

Dr. A. B. Moore of Rochester attended the Roentgen Ray Society convention which was held in Los Angeles, September 12 to 16.

Dr. Verne C. Hunt of the Mayo Clinic, Rochester, has returned from a three weeks' trip to Duluth, Buffalo and the New England states.

Dr. C. O. Estrem and family of Fergus Falls have returned from a three weeks' trip through the southern and northern parts of Minnesota.

Dr. G. E. McCann of Nevis, Minnesota, has located his practice at Kensington and will work in conjunction with Dr. F. W. Powers at Barrett.

Dr. and Mrs. H. E. Douglas and daughter, Agnes, of Blackduck, have returned from a motor trip through southern Minnesota and Iowa.

Dr. A. S. Jackson, formerly a fellow in surgery in the Mayo Foundation, announces his association with the Jackson Clinic, Madison, Wisconsin.

MISSISSIPPI VALLEY TUBERCULOSIS CONFERENCE

OFFICERS

Robinson Bosworth, M. D., St. Paul—President.

P. G. Peterson, M. D., Columbus, Ohio—Vice President.

H. E. Deerholt, M. D., Milwaukee—Secretary-Treasurer.

The tenth annual meeting of the Mississippi Valley Tuberculosis Conference will take place at Milwaukee, October 9, 10, 11, 1922. In addition to the speakers of the Mississippi Valley States, the following visitors will address the conference:

Dr. Lawrason Brown, President, National Tuberculosis Association, New York City.

Dr. David A. Stewart, Ninette Sanatorium, Manitoba, Canada.

John A. Kingsbury, Milbank Memorial Fund, New York City.

Dr. H. A. Pattison, Supervisor of Medical Service, National Tuberculosis Association, New York City.

Dr. C. D. Parfitt, Superintendent and Medical Director, Calydon Sanatorium, Gravenhurst, Ontario, Canada.

Dr. A. M. Forster, Physician in Chief, Cragmor Sanatorium, Colorado Springs, Colorado.

Dr. David R. Lyman, Superintendent, Gaylord Farm Sanatorium, Wallingford, Connecticut.

Owen R. Lovejoy, General Secretary, National Child Labor Committee, New York City.

Philip P. Jacobs, Publicity Director, and

Dr. Linsley Williams, Managing Director, National Tuberculosis Association, New York City.

Dr. M. P. Ravenel, former President, National Tuberculosis Association.

WESTERN SURGICAL ASSOCIATION

The next meeting of the Western Surgical Association will be held in Minneapolis, December 8 and 9, 1922. Headquarters for the meeting will be located at the Radisson Hotel.

Dr. J. R. Sturre of Watkins has purchased the lot next to the Watkins State Bank for the purpose of erecting a combined hospital and office building.

Dr. E. C. McBeath has announced the opening of an office at 663-664 Hamm Bldg., St. Paul. Dr. McBeath specializes in the diseases of children.

Dr. and Mrs. O. J. Baldwin, who have made their home at Chisholm for the past two years, have left for Rockford, Illinois, where Dr. Baldwin will practice.

Dr. E. M. Johnstone announces the opening of offices for the practice of medicine and surgery in Pasadena, California, Dowarth building, suite 207-208.

Dr. William H. Rumpf of Faribault, who with his son, Ernest, of Minneapolis, recently spent a few weeks at Bemidji, has returned to his practice at Faribault.

Dr. G. H. Jackson of Rochester has gone to Billings, Mont., where an epidemic of infantile paralysis is raging, to aid in suppressing the disease in that community.

Dr. J. S. McCartney, Assistant Professor of Pathology at the University of Minnesota, formerly a fellow in the Mayo Foundation, visited the Mayo Clinic, September 5.

Dr. F. A. Wenger, formerly City and County physician, St. Paul, has become associated with Dr. Adolph H. Ahrens at 920 Rice street, where he will maintain a private practice.

Dr. Gilmer, who has been a fellow in pathology in the Mayo Foundation since January 1, has left for a year's internship in St. Vincent's Charity Hospital, Cleveland, Ohio.

The Ramsey County Medical Society has endorsed the placing of the American Medical Association automobile emblem on their automobiles by those members who desire to do so.

Dr. Harry Bartron and family of Watertown, S. D., were guests of Dr. Bartron's mother at Lake City recently en route to Boston, Mass. The entire trip is being made by automobile.

Dr. H. B. Ward, formerly Dean of the College of Medicine at the University of Nebraska, now Professor of Ecology at the University of Illinois, recently visited the Mayo Clinic.

Dr. H. T. McGuigan of Red Wing was a speaker on the program of the meeting of the Red Wing Kiwanis Club last month. His address was concerned with his recent tour of Europe.

Dr. B. F. McGrath, Dean of the Medical School and Professor of Bacteriology and Pathology at Marquette University, Milwaukee, formerly of the Mayo Clinic, recently visited the Clinic.

Dr. C. W. Wells of the Rockefeller Foundation, visited the Mayo Clinic August 9.

Dr. H. A. DesBrisay left the Mayo Clinic August 14 on a year's leave of absence.

Dr. C. R. Sanborn, who has been a practicing physician in Bemidji, has sold his practice to Dr. B. J. Martin. Dr. Sanborn is planning to take up postgraduate work before seeking a new location.

Dr. John T. Bowers, who for several years has been associated with his brother, Dr. Harry E. Bowers, in his practice at Lake City, has opened his office in River Falls, Wisconsin, for private practice.

Dr. and Mrs. Horace Newhart, Minneapolis, have re-

turned home from a short trip to California. In San Francisco they were with Mrs. Newhart's sister, Mrs. Charles T. Perry of New York.

Dr. R. G. Andres has moved to St. Paul, where he has opened a temporary office at 936 Lowry Bldg. for the practice of general surgery. Dr. Andres has spent several years at the Mayo Clinic in Rochester.

Dr. and Mrs. R. Turnbull of Fosston have returned from a trip to Winnipeg. Dr. Turnbull recently injured two fingers of his right hand thus making it impossible for him to carry on his surgical work for a time.

Dr. Stella L. Wilkinson, who has returned from a year's study at the postgraduate school of medicine of the University of Pennsylvania, has announced the opening of her office at 224 New Jersey Bldg., Duluth.

Dr. George Schlesselman, for several years a practitioner at Taylor, Wisconsin, has taken up his practice at Good Thunder, Minn. Dr. and Mrs. Schlesselman were recently the guests of Dr. J. T. Schlesselman and family at Mankato.

Dr. Sara A. Nimocks who has been with the State Teachers' College at Winona, Minnesota, for several years, is among the new members of the faculty of the Northern Normal and Industrial School at Aberdeen, S. D., this year.

Dr. Schultz, who has been a student in pathology in the Mayo Foundation since April 1, has gone to San Francisco, where he will resume his duties as associate professor of Bacteriology and Experimental Pathology, at Stanford University.

Dr. Thayer C. Davis, formerly of Glenwood, has moved to Wadena, where he will practice in partnership with his brother, Dr. Thomas L. Davis, under the firm name of Davis & Davis, physicians and surgeons. The brothers are sons of Dr. A. M. Davis.

Dr. Bozer, who has completed a fellowship in the Mayo Foundation, has gone to Logansport, Indiana, where he will visit at his home before he enters the Butsch Clinic in Buffalo. Dr. Bozer will have charge of the Nose and Throat Section at the Butsch Clinic.

Announcement has been received of the marriage of Miss Eva Enke of Rochester and Dr. Edward T. Butler, formerly of the Mayo Clinic, at Buffalo, N. Y., August 21. Dr. and Mrs. Butler will make their home at 438 Delaware Ave., Buffalo. Dr. Butler is associated with the Buffalo Clinic.

Dr. and Mrs. E. R. Dezell, Minneapolis, have returned from a three months' trip to the Pacific coast. They went by way of the Canadian Rocky Mountains and north as far as Alaska, thence to southern California by boat. In La Crosse, Wash., Dr. and Mrs. Dezell were the guests of Dr. Dezell's mother.

The marriage of Miss Edith C. Smith and Dr. Frank E. Ellison of Monticello was solemnized Friday evening, September 1, at the home of the bride's parents in Monticello. Dr. and Mrs. Ellison have returned from a two weeks' motor trip through the northern part of the state and are now at home in Monticello.

Dr. William H. Rumpf, Jr., of Ann Arbor, Mich., son of Dr. William Rumpf of Faribault, and Miss Dorothy Rosholt of Minneapolis, were married Wednesday, September 6, at Minneapolis. Dr. Rumpf is on the staff of Dr.

Reuben Peterson in the department of gynecology and obstetrics of the University of Michigan.

The marriage of Dr. J. R. McNutt of Two Harbors and Miss Elsie Gerlach of Barnum, Minn., was solemnized at the Spaulding Hotel, Duluth, Wednesday evening, August 30. Following an automobile trip through the Northwest, Dr. and Mrs. McNutt will be at home in Two Harbors, where Dr. McNutt is a member of the local hospital staff.

Dr. C. P. Robbins, of Winona, has returned from St. Louis, Mo., where he recently completed some special medical work at the University of Missouri. Previous to his work in St. Louis, Dr. Robbins took up a course in the study of blood chemistry and metabolism at the Presbyterian hospital with Professor Weaver of the University of Illinois.

The opening of the Grygla hospital which has been closed for some time, took place October 1 upon the completion of extensive repair and improvement work. Dr. C. M. Adkins of Thief River Falls, who for a number of years conducted the hospital at Grygla, will return to the village for the purpose of becoming medical director of the institution.

Mrs. Charles E. Proshek, wife of Dr. Proshek of Jordan, arrived in August in New York from Europe. Mrs. Proshek was met by Dr. Proshek in New York and both came west to New Prague, where they were the guests for a time of Dr. Proshek's parents. They are now at home in Jordan, where Dr. Proshek is connected in his practice with Mudbaden Sanatorium.

A quiet wedding of August was that of Dr. M. C. Bergheim of Hawley, Minnesota, and Miss Mildred M. Engquist of Minneapolis, who were married at St. Anthony Park, August 13. Mrs. Bergheim is a graduate of the University of Minnesota, where she received both her Bachelor of Arts and Master of Arts degrees. She was also elected a member of the Phi Beta Kappa honorary scholarship fraternity.

Dr. Kretschmar, a physician of Munich, Germany, will be associated with the St. John's hospital clinic at Red Wing beginning November 1. Dr. Kretschmar expects to be connected with the clinic for about a year.

Dr. Reuben A. Johnson, who has been associated with Dr. G. D. Head, Minneapolis, will leave this month for a year's postgraduate study in internal medicine in Vienna and other European centers.

The resignation of Dr. Aaron F. Schmitt, secretary-general of the Southern Minnesota Medical Association, has been tendered and regretfully accepted by the Executive Committee of that association. Taking over the executive work at a time when the organization was a loosely joined association of southern Minnesota societies, Dr. Schmitt, through his genius in arranging programs and supervising the multitudinous details always involved in association work and his untiring and self-sacrificing industry in connection with the affairs of the association, has built up this medical organization until it has become one of the foremost and most important of the mid-west associations. Some of the programs arranged for the association were most elaborate and included the names of celebrities from all parts of the country, which served to greatly stimulate local medical thought and interest.

NEW AND NON-OFFICIAL REMEDIES

In addition to the articles enumerated in the September issue, the following articles were accepted during July by the Council on Pharmacy and Chemistry for inclusion in New and Non-Official Remedies:

INTRA PRODUCTS Co.:

Ven Calcium Cacodylate Ampules-Ipco.

WINTHROP CHEMICAL Co.:

Theocin.

During August the following articles have been accepted by the Council on Pharmacy and Chemistry for inclusion in New and Non-official Remedies:

G. W. CARRICK Co.:

Corpus Luteum-G. W. C. Co.

GRADWOHL LABORATORIES:

Sterile solution of Mercury Oxycyanide-Gradwohl.

LEDERLE ANTITOXIN LABORATORIES:

Pollen Antigens-Lederle.

Solution Epinephrine-Lederle.

NEW YORK INTRAVENOUS LABORATORY:

Loeser's Intravenous Solution of Mercury Oxycyanide.

PARKE, DAVIS AND Co.:

Antipneumococcic Serum (Polyvalent).

WINTHROP CHEMICAL Co.:

Luminal Sodium Tablets, 1½ grains.

Sterile Solution of Mercury Oxycyanide.—Each ampule contains 5 c.c. of solution, representing 0.008 gm. (¼ grain) of mercuric oxycyanide-N.N.R. For a discussion of the actions, uses and dosage of mercuric oxycyanide, see New and Non-official Remedies, 1922, p. 192. Gradwohl Laboratories, St. Louis.

Loeser's Intravenous Solution of Mercury Oxycyanide 0.012 Gm.—Each ampule contains 5 c.c. of solution, representing 0.012 gm. (3-16 grain) of mercuric oxycyanide-N.N.R. For a discussion of the actions, uses and dosage of mercuric oxycyanide, see New and Non-official Remedies, 1922, p. 192. New York Intravenous Laboratory, New York.

Antipneumococcic Serum (Polyvalent)-P. D. and Co.—Antipneumococcus Serum (see New and Non-official Remedies, 1922, p. 287) prepared from the blood of horses immunized with virulent cultures of pneumococci (Type I, II, III and Group IV) and standardized against Type I culture so as to be of the same strength as Type I serum. Marketed in piston syringes containing 50 c.c., with needle and connections. Parke, Davis and Co., Detroit.

Luminal Sodium Tablets 1½ grains.—For a discussion of the actions, uses and dosage of luminal, see New and Non-official Remedies, 1922, p. 61. Winthrop Chemical Co., Inc., New York. (Jour. A.M.A., Aug. 19, 1922, p. 628.)

Pollen Antigens-Lederle.—Liquids obtained by extracting the dried pollen of plants with a liquid consisting of 67 per cent glycerin and 33 per cent saturated solution of sodium chlorid. Pollen antigens-Lederle are marketed in the following forms:

Series A: containing doses 1 to 5 inclusive (2.5, 5, 10, 20 and 25 pollen units, respectively).

Series B: containing doses 6 to 10 inclusive (30, 50, 75, 100 and 150 pollen units, respectively).

Series C: containing doses 11 to 15, inclusive (250, 375, 500, 750 and 1,000 pollen units, respectively).

Complete Series: containing 15 doses.

Diagnostic: containing 1 dose (100 pollen units).

Pollen antigens-Lederle are employed in the diagnosis and treatment of hay fever (pollenosis). (See New and Non-official Remedies, 1922, p. 232.) The following pollen antigens-Lederle have been accepted:

Arizona Ash (*Fraxinus Toumeyii*).

Arizona Walnut (*Juglans major*).

Black Walnut (*Juglans nigra*).

Careless Weed (*Amaranthus palmeri*).

Cottonwood (*Populus macdougalii*).

June Grass (*Poa pratensis*).

Ragweed (*Ambrosia elatior*).

Red Top (*Agrostis palustris*).

Sage Brush (*Artemisia tridentata*).

Sheep Sorrel (*Rumex acetosella*).

Slender Ragweed (*Franseria tenuifolia*).

Sweet Vernal (*Anthoxanthum odoratum*).

Timothy Pollen (*Phleum pratense*).

Lederle Antitoxin Laboratories, New York. (Jour. A. M. A., Aug. 26, 1922, p. 739.)

Theocin.—A brand of theophyllin-U. S. P. prepared synthetically. For a description of theophyllin, see U. S. Pharmacopeia. Winthrop Chemical Company, New York. (Jour. A. M. A., Aug. 26, 1922, p. 739.)

PROPAGANDA FOR REFORM

Eto-So-Erc.—A circular letter, signed T. M. Berry, M. D., New Orleans, recommends the intravenous use of "Eto-So-Erc" ("Creosote" spelled backward) in the treatment of pulmonary tuberculosis, influenza, pneumonia, bronchitis and pulmonary gangrene. Eto-So-Erc is stated to be a "highly purified form of Beechwood Creosote, especially prepared for intravenous administration." It is asserted that "it comes in direct contact and becomes fixed to the pathologic tissue and bacteria." Creosote is credited with being of some value in tuberculous infections when taken orally. It is most probable that any benefits derived from the administration of creosote are due to the local effect on the alimentary canal, on the bronchitis and to the antipyretic action; hence, the benefits would not be obtained from its intravenous injection. The argument is advanced for Eto-So-Erc that, in respiratory infections, tubercle bacilli are destroyed by blood containing small amounts of creosote. This assertion is misleading because the tubercle bacilli in the lungs are embedded in the tissues and, therefore, are inaccessible to the creosote said to be contained in Eto-So-Erc. To give creosote, a readily absorbed drug, intravenously, is irrational and unscientific (Jour. A. M. A., Aug. 5, 1922, p. 492.)

Zinc Stearate Dusting Powders.—Untoward effects from the accidental aspiration of zinc stearate dusting powder by infants are reported. In some cases, bronchopneumonia, of a more or less fulminating type, has ensued. In other infants, an acute toxemia was the most conspicuous symptom. The zinc stearate container, with its large perforations, as now prepared for the nursery, appears to be a distinct menace to the health of infants. (Jour. A. M. A., Aug. 19, 1922, p. 663.)

The "Natural Health School" seems to be the latest creation of Milo Erskine Yergin and his wife. In 1920, Yergin was president of the "Co-Operative Food Company." This concern advertised "Dr. Yergin's Pus and Pain Chart." The chart sold for \$10 and was advertised with the claim that it would enable one, "with the simple foods of nature," to control and obliterate completely, in from fifteen minutes to fifteen hours, any kind of pain and all pus conditions. The use of the chart required "Sea Food Baths," "Earth Food Table Salt," "Food Iodine," "Cinnamon Food Oil," "Myrrh Compound," and "Cold Food." All were for sale by the Co-Operative Food Company at prices ranging from 25 cents to \$3 a package. The Natural Health School seems to combine a strong mixture of religious fanaticism with the practice of the healing art.

Yergin put forward a "True Musical Therapy" whereby, with the aid of a piano "thoroughly in tune and having high quality strings," it is possible to produce vibration rates corresponding to chemical elements! It is asserted that if the keys corresponding to mercury and chlorine are struck, a sensitive person will respond with a flow of saliva in the month. If the keys are kept sounding for a few moments, a bowel action will be started. The possibilities in treating stomachache, soft corns, psoriasis or smallpox by playing the piano seem unlimited. The preposterous nonsense promulgated by Yergin is, apparently, accepted at its face value by many laymen and not a few so-called "drugless practitioners." The harm that men of this type can do is realized when one reads of persons who are "treating" sufferers from tuberculosis, cancer and equally serious conditions by the fantastic principles laid down by Yergin, and by the nostrums sold by him. (Jour. A. M. A., Aug. 26, 1922, p. 757.)

PROGRESS

Abstracts to be submitted to Section Supervisors.

MEDICINE

SUPERVISORS:

F. J. HIRSCHBOECK,
FIDELITY BLDG., DULUTH
THOMAS A. PEPPARD,
LA SALLE BLDG., MINNEAPOLIS

FURTHER STUDIES OF ROENTGENOGRAPHIC PLEURAL ANNULAR SHADOWS IN PULMONARY TUBERCULOSIS—J. Burns Amberson (Am. Rev. of Tuberculosis, August, 1922).

This author's paper outlining his hypotheses concerning pleural annular shadows was reviewed in these columns in 1921.

It is to be recalled that the localized pneumothorax theory was not accepted and evidence was offered to show that these shadows were produced by the presence of simple chronic or subacute localized pleurisy. Clinically it was shown that the shadows developed and enlarged as accompaniments of active intra-pulmonary disease. The present paper records several additional observations.

The first of these was the finding in one case that the fluid accompanying the peculiar pleural lesion was of the macroscopic character of an ordinary serous effusion. In two cases he observed the development of pleural shadows during the reabsorption of monolateral pleuritic effusions. The author then criticizes the publication of Barlow and Thompson which appears in the *American Review of Tuberculosis*, 1921, Vol. 5, page 611.

T. A. PEPPARD.

THE "TUBERCULIN" TREATMENT OF BRONCHIAL ASTHMA—W. Strom vanLeeuwen and H. Varecamp (*Munchener Medizinische Wochenschrift*, June 9, 1922). For some time, the authors have considered bronchial asthma and vasomotor rhinitis as disturbances of the nitrogen metabolism and have treated them by a "purine-free" diet and large amounts of calcium chloride. The results obtained were fairly satisfactory, especially after their procedure was revised to include inhalations of benzyl-benzoate.

Working along the lines as introduced by Dr. Chandler Walker of Boston, that the acute attack of asthma was induced by the inhalation or the ingestion of some protein to which the individual was hypersensitive, they arrived at the following hypothesis: An acute asthmatic attack is, in many cases, caused by a reaction, which although not entirely identical with anaphylactic shock, is still, at least, very similar. Asthmatic cases have increased sensitiveness toward certain material (probably protein). But because most men who live in precisely the same surroundings as the asthmatics are not sensitive, there must be some basic principle present in the constitution of asthmatics. Further, many asthmatics have a strongly increased sensitiveness to tuberculin. It is possible that the same principle that produces this increased reaction to tuberculin, also produces an increased reaction to the "allergy" phenomena. If this is so, it can be attempted to lessen this increased sensitiveness by cautious treatment with tuberculin.

On this hypothesis, they have treated a series of 28 cases with the following results: 18 complete cures; 4 greatly improved, only a chronic bronchitis remaining; 5 cases only slightly improved—three of these showed an occasional attack one a severe bronchitis, the other had a myocarditis with dyspnea. This series was reported about six months ago. At the present time, their total number of cases has reached one hundred and fifty. The results have been practically the same as in the earlier report.

Relative to the method of treatment the following should be noted: Treatment in a hospital is most desirable as here all conditions can be regulated. Rest in bed is of primary importance; purine-free diet. Inhalations of benzyl-benzoate, or benzyl-benzoate per mouth. In case of chronic bronchitis, codeine and potassium iodide. At the first indication of an acute attack, an injection (subcutaneous) of from 2 to 1.00 c.cm. of 1-1000 solution of adrenalin. The tuberculin treatment consists of an injection of 1 c.c. of 1-100,000 solution of tuberculin (T. O. A.) every second day. Patients who show a very weak skin reaction (v. Pirquet) are given daily injections. The intervals between injections are gradually lengthened; the

entire course of treatment is about six months long. Patient is allowed to get up on the sixth or seventh day and to leave the hospital after the fourteenth day.

The contra-indication for this treatment is an active pulmonary tuberculosis.

Finally, they have considered the tuberculin treatment of utmost importance in most cases, yet they have used the other methods such as adrenalin, codein and potassium iodide and purine-free diet.

Cases failing to respond to the tuberculin treatment also prove resistant to other forms of treatment, intravenous injections of glucose, etc.—vaccine therapy.

C. K. WILLIAMS.

THE FUNDAMENTAL PRINCIPLES OF AUSCULTATION—E. Rist (*Ann. de Med.* 10, 317-331, October, 1921—translated by Alano Pierce).

Rist first refers to the work of Boudet and Chaveau and their experiments with a horse suffering from pneumonia. These workers sectioned the trachea and then observed the character of the breath tones over the pathologic and normal lung when the animal was breathing through the tracheotomy wound and when breathing normally.

It was found that the tubular breathing over the consolidated area as well as the bronchial character of the normal breath tone was lost when the air passed through the new opening. If the opening was artificially narrowed a whistling sound analogous to the laryngo-tracheal sound was heard on auscultation and, if the wound was closed, then the bronchial respiratory sound was heard. The vesicular murmur on the contrary persisted without any modification during all the phases of the experiment. It was also found that upon sectioning of the vagi nerves that the vesicular murmur was abolished. This is because the section of the vagi determined the paralysis of the bronchial muscles and hence the abolition of muscular tonus of the little sphincters which make narrow the extremities of the last bronchial ramifications at the entrance to the alveolar sacs.

The author then gives his experience with a patient who had had a tracheotomy and who had tuberculous changes in both upper lobes with cavity formation. On this patient he was able to duplicate the experimental findings of the earlier experimenters.

The conclusions are then that there are two respiratory sounds absolutely different by the nature of the origin and mode of production, namely, the vesicular murmur and the "glottic souffle," the former being produced in the lung parenchyma, the latter produced by the passage of a current of air both inspiratory and expiratory, across the glottis. It is shown, also, that transmission of this latter sound is through the air column.

T. A. PEPPARD.

THE RELATIVE PHOSPHORUS CONTENT OF THE BLOOD WITH SPECIAL REFERENCE TO CANCER—John Vörschutz and Joseph Vörschutz—*Deutsches Medizinische Wochenschrift*.

This question was first taken up and reported by Gröbly. He has worked out the phosphorus content of the blood in various conditions of health and disease and with special reference to the biological chemistry of can-

cer. As a result of his research, he has established the relative phosphorus content as a basis for the prophylaxis, diagnosis and therapy of malignant tumors. He found that a phosphorus content of more than 1.526 per cent indicated malignancy and that a phosphorus quotient of more than 3.17 was present in cases suspected of being malignant with the exception of carcinoma of the pancreas when the quotient is lower. Vörschutz reports a series of cases diagnosed by this method and verified by clinical methods, biological reaction and x-ray findings.

The origin of the phosphorus in the organism can be traced to the nucleo-proteids which are combinations of albumen and nuclein. On splitting up the nuclein molecule, the cleavage products are phosphoric acid, a nuclein base besides other substances such as purin-pyridin, etc. Nuclein, which is an absolute combination of phosphorus and albumen, occurs in every cell, so that any destructive process involving the nuclei acts reflexly on the phosphorus content of the bones and the lecithin of the nervous system. Various investigators have shown that the phosphorus content of bones is increased in case of cancer and decreased in case of tuberculosis. Also the bones show an excess of potassium and a deficiency of sodium in tuberculosis.

Gröbly experiments were based on the theory that the increase in P_2O_5 was in the erythrocytes in spite of the low erythrocyte count. He determined his " P_2O_5 Quotient" on this basis, namely the amount of phosphorus in 10 c.cm. of blood expressed in milligrams, divided by the first two figures of the blood count (i.e. 11:6 mg.— P_2O_5 —RBC 2.6 million, $Q = 11.6/2.6 = 4.5$).

The following is a table commutated on his results.

Case No.	Diagnosis	Milligrams of Phosphorus per 100 cc.	Erythrocyte Count	Phosphorus Quotient
1.	No disease	11.8	4,500,000	2.6
2.	Epididymitis	11.8	4,000,000	2.9
3.	Teno-synovitis	11.4	4,200,000	2.7
4.	No disease	11.0	4,000,000	2.7
5.	No disease	11.7	4,300,000	2.9
6.	Lympho-sarcoma ...	12.4	4,100,000	3.02
7.	Ca. of rectum.....	12.9	3,200,000	4.03
8.	Ca. of oesophagus..	9.2	3,600,000	2.6
9.	Puerperalsepsis	8.4	3,200,000	2.7
10.	Erysipelas	7.8	.....	....
11.	Icterus, chronic ...	23.8	3,500,000	6.8
12.	Ca. of uterus.....	12.8	3,600,000	3.55
13.	Sepsis	11.3	4,000,000	2.8
14.	Ca. of intestine....	11.6	2,690,000	4.5
15.	Ca. of uterus.....	11.9	3,200,000	3.7
16.	Ca. of parotid.....	8.8	.....	....
17.	Ca. of colon.....	13.9	4,300,000	3.3
18.	Ca. of stomach....	11.9	3,200,000	3.7
19.	Icterus	13.9	4,200,000	3.3
20.	Ca. of oesophagus..	9.9	2,900,000	3.4
21.	Icterus	13.7	3,700,000	3.7
22.	Pulmonary tuber- culosis	10.6	3,600,000	2.944
23.	Icterus	16.2	4,600,000	3.6

It will be noticed that cases of icterus show an increased P_2O_5 quotient, also that P_2O_5 quotients above 3.17 are

very definitely positive of malignancy. In making these tests centrifuged erythrocytes were used in place of the whole blood as has been used formerly by other investigators.

The determination of the phosphorus quotient is of very great importance in the diagnosis of cancer if one excludes the following conditions, icterus, pneumonia and typhoid. Whether this determination will aid in the solving of the cancer problem is purely a theoretical question but it should be of value in the early diagnosis of cancer before the appearance of clinical symptoms and thereby gaining time for the institution of proper treatment.

C. K. WILLIAMS.

PNEUMOCOCCAL PERITONITIS—McCarthy & Fraser (British Journal of Surgery, April, 1922).

Pneumococcal peritonitis is a comparatively rare disease, and probably not diagnosed as frequently as it should be.

The cases may be classified into two main groups: The primary cases, which may be acute and chronic, and the secondary cases, the latter not being subdivided, being generally of a subacute character. The primary has formerly been known as the idiopathic type, because the exciting cause was an infection by the pneumococcus with no visceral lesions apparent as the source of the infection.

Many theories have been advanced as to the mode of infection. Rischbieth thought that primary pneumococcal peritonitis was in reality secondary, being always secondary to pneumococcal septicemia. Stoos thought that the infection passed through the wall of the intestinal tract, producing a peritoneal irritation, but it has always been impossible to demonstrate any lesion in the intestinal mucosa permitting of invasion of the wall. Some have also thought that invasion by the lymphatic route was probable by way of the lymphatics about the throat and bronchi, passing thence to the subperitoneal lymphatics, which, of course, is contrary to all the modern conceptions of lymphatic anatomy. The authors believe that the infection is universally by the genital tract in the female in primary cases of pneumococcal peritonitis. This mode of infection would be analogous to the gonococcal peritoneal infection and tuberculous peritonitis from tubal tuberculosis in the female. In their study of 56 cases, the authors never found examples of the primary variety in the male, although only 12 boys were observed. In the 44 females observed, 36 were obviously of the primary pneumococcal type. The rather remarkable feature is the preponderance of the disease in primary cases during the period from the 3rd to the 7th year, particularly in the 5th and 6th years of life. They believe this due to the beginning patency of the female vagina at that time of life, and the alkaline reaction of the vaginal secretion up to the age of 8. The symptoms of the disease in children, as observed by the authors, seemed to point to infection in the genital tract—pain on micturition, frequency of urination, pain in the lower abdomen, and diarrhea probably due to irritation of the pelvic colon. Rischbieth, in the paper previously mentioned, gives his mortality as averaging 88.8 per cent in the collected statistics from the London Hospital. Operation was followed by a mortality of 30 per cent. The authors believe that early operation affords the best prospect for recovery. Early vaginal drainage is in-

stituted, and a transfusion done by the citrate method after a suitable donor has been selected. The transfusion must be done just when the evidences of septicemia are beginning to make their appearance; if done earlier it does not appear to prevent the onset, and if done too late the heart may be so weakened that little beneficial effect can be looked for. They believe that a reduction in the mortality rate in the patients operated on at the Children's Hospital from 65 per cent to 42 per cent, in three years, has been due to the influence of blood transfusions, as advised by the authors. However, it appears to me that the statistics are too meagre to permit an unqualified statement of this kind.

F. J. HIRSCHBOECK.

COMPARATIVE PROGNOSIS IN TUBERCULOUS LESIONS OF THE RIGHT AND LEFT LUNG—Stivelman & Miller (Am. Jour. Med. Sc. July, 1922).

The study is based on an analysis of 1,048 cases from the Montefiore Co. Sanatorium, Bedford Station, New York, and their conclusions are an interesting corollary to the controversy between Brown and others relative to the comparative prognosis of tuberculous lesions in the right or left lung. Their results show that in early tuberculosis the right side is affected twice as frequently as the left, but that as the disease progresses there is a marked increase in the percentage of involvement of the left lung, so that in advanced disease the lungs are numerically equally involved. They believe that predominating left lung lesions run an active course more often than those in the other side of the body, but that in early cases it is immaterial prognostically as to which side is involved.

It has been thought by some writers that the narrow caliber of the left bronchus influences a more rapid progress of the disease when once implanted in this lung. The authors believe that a more rational explanation for this greater gravity in left sided lesions is to be found in the following: Firstly, the fact that the left lung has but one interlobar tissue where the right lung has two, which they believe has a tendency to permit more rapid extension through the lung. The natural barrier afforded by the double layers of serous membrane, being only single on the left side and plural on the right. They also indicate rather half-heartedly, it appears to me, that atelectasis in the left lower lobe partial in extent and due to encroachment by the pericardium and its contents on the left lower lobe, favors the development of tuberculosis. As less likely factors, they consider sinistricardia and the evil influence on the stomach due to contraction by the more or less collapsed pulmonary tissue with diaphragmatic fixation.

J. HIRSCHBOECK.

A CRITICISM OF RECENT INTERPRETATION OF ANNULAR SHADOWS IN LUNG ROENTGENOGRAMS—Burnham and Brown (Am. Review of Tuberculosis, August, 1922).

These authors criticized the localized pneumothorax theory of Sampson, Heise, and Brown and also the theories of Amberson. Their argument is that these shadows can be shown to be produced by cavitation. All autopsies on known cases with annular shadows have been shown to have cavities.

The time utilized in exposing stereoscopic lung plates is said to be, as a rule, much too long, the authors making their exposures in one-fortieth of a second. Plates were taken at right angles to the anterior posterior plane in order to show the exact position of any distinctive shadow. This was done in order to show that lung markings could be superimposed upon an annular shadow which was in fact a cavity.

In three cases it was shown that the area in question presented a perfectly definite opening into a bronchus, this opening being at or near the lowest point of the cavity. Another method which they used to support their conception of the etiology of the shadows was to partially collapse the lung by introduction of air, the absence of pleural adhesions then being demonstrated, a lessening of the size of the cavity, an alteration in its shape and a change in location then took place.

T. A. PEPPARD.

SURGERY

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THE INTRAMUSCULAR ADMINISTRATION OF SODIUM CITRATE, A NEW METHOD FOR THE CONTROL OF BLEEDING—Harold Neuhof and Samuel Hirshfeld (Ann. of Surg., July, 1922).

Impressed by the fact that patients who received transfusions of citrated blood showed a decrease of clotting-time rather than the reverse, the authors undertook to discover the cause. They found that following intravenous or intramuscular injections of sodium citrate solutions there is a progressive fall in the clotting-time which reaches a peak in about 40 minutes, this peak being sustained for an additional hour. The value then slowly returns to its former value which is reached in 24-48 hours. Thus a 10-minute coagulation time may be reduced to two minutes for a short period.

On intravenous injection, there is no fixed toxic or lethal dose per kilogram of body weight, toxicity depending to a remarkable degree upon the rate of injection of the citrate solution and a toxic or lethal dose is characterized by a swing from the state of shortened coagulation time to one of suspended coagulation (incoagulability of the blood).

Intramuscular injection, although painful, is free from the dangers of toxicity and is the method of choice.

The reduction of clotting-time occurs not only in normal individuals, but also in those in whom there is a pathological increase of the coagulation time, notably in jaundice. It does not occur in blood diseases characterized by blood platelet deficiency as hemophilia and purpura. The dose for intramuscular administration is nine grams for adults. A thirty per cent solution is used, fifteen c.c. into each buttock, preceded by novocaine.

DONALD K. BACON.

MEGASIGMOID, MEGARECTUM, FECAL BOLUS—F. G. Corbin, Mendoza, Argentine Republic. (Surg., Gyn. and Obst., July, 1922.)

Corbin describes a condition which he believes to be far more common in the interior of the Argentine than anywhere else in the world. He has seen some 200 cases in the past thirty years and thinks it to be a clinical entity entirely distant from the congenital megacolon of Hirschsprung. The majority of the cases are 35-50 years of age and the pathology is, in 95 per cent, in the first part of the rectum and the iliac sigmoid immediately above.

These cases show a marked dilatation of the sigmoid and rectum with hypertrophy of all coats of the intestinal wall which may be as thick as one centimeter. Within is a hard fecal mass somewhat the shape of a football, which may be as large as 50 cm. in circumference and weigh 600-700 gm. This mass can be felt through the abdominal wall and frequently gravitates to the mid-line or over to the right iliac fossa. As a rule the patient furnishes the diagnosis which is confirmed by recto-abdominal examination. At times, however, the condition is not suspected and it may even be accompanied by a diarrhea of fluid material which passes between the mass and the gut wall.

For treatment, various measures may be resorted to. In many instances the impaction can be removed per rectum by the finger or a spoon. At times it can be crushed through a lax abdominal wall and removed with enemata or cathartics. The accumulation may defy these tactics and necessitate laparotomy. It can then frequently be crushed through the unopened gut wall and pulverized for passage per rectum. As a last resort the gut may be incised and the tumor removed intact.

Patients suffering from this condition are markedly toxic with earthy-colored skin, subnormal temperature and become markedly emaciated.

After the rectum is emptied the general condition improves, but the local condition shows no tendency toward a spontaneous cure and recurrences are frequent. Corbin has attempted a plication operation based on Moynihan's gastroplication with fair success.

Corbin thinks the condition results from constipation and chronic sigmoidal stasis in an originally normal gut and may take years to fully develop. In a few cases at Perthes peritoneal fold between the first and second portions of the rectum may contribute to the stasis.

DONALD K. BACON.

TRAUMATIC ASPHYXIA—T. M. Green (Surg., Gyn., Obst., August, 1922).

This condition is brought about by compression of the chest and abdomen over an extended period of time, causing a suspension of the respiratory function.

The reported cases exhibited certain striking and more or less constant characteristics, i.e., the appearance of the skin, head, face and neck, differing only in degree. The color of the skin becomes a dark red to purple, and the discoloration may be discrete or confluent, covering the face and neck, extending sometimes down as far as the third rib on the chest. On the back the discoloration may cover the area of the trapezius muscles. Subconjunctival hemorrhages are common to all cases, while

hemorrhages from the nose, mouth, and ears frequently occur. Punctuate ecchymoses on the pleura, pericardium and abdominal viscera are common. Pulmonary engorgement, râles and bloody expectoration may be present.

The condition is explained by lack of competent valves in the veins of the head. Sections of skin removed for study show that there is no extravasation of blood from the vessels, but that intense distention and engorgement occurs within the vessels, perhaps from vasomotor paralysis.

Treatment consists in the use of stimulants, application of oxygen and artificial respiration. Most cases that recover consciousness from the original injury go on to complete recovery. "Contusion pneumonia" may occur about the third day. Optic nerve atrophy and opaque patches in the macula have been reported.

Several excellent illustrations accompany the article.

DONALD K. BACON.

A NEW SIGN IN THE DIAGNOSIS OF URETERAL STONES—Bransford Lewis (Jour. of Urology, June, 1922).

Lewis discourses on the methods now employed and those used in the past to distinguish ureteral calculi from other calcified bodies which may be found in the same vicinity. The Roentgen ray unaided will demonstrate a stone but gives no very conclusive evidence as to its location inside or outside the ureter. If an opaque ureteral catheter be introduced through a cystoscope a urinary calculus will be shown in contact with it. At times a phlebolith shadow may be superimposed on that of the catheter giving a very similar appearance. Kretschmer and others have sought to avoid this difficulty by making a double exposure on a single plate with a shift of several inches in the position of the tube between exposures. This procedure solves the problem in many instances by showing an interval between stone and catheter in one or other of the exposures. There still remains a small group of cases in which an extra-urinary stone situated very close to the ureter cannot be identified as such. Lewis surmounts the difficulty by inserting a stiff metal ureteral dilator into the ureter. This instrument does not adapt itself to the curve of the ureter but causes the ureter to conform to the shape in which it has previously been bent thereby straightening it and moving it over a distance of a centimeter or more. At the same time the shadow will be removed from that of any extraurinary stone which may have previously covered it.

DONALD K. BACON.

STREPTOCOCCUS SCROTAL AND PENILE GANGRENE—M. F. Campbell (Surg., Gyn. and Obst., June, 1922).

Campbell reports five cases of acute, fulminating gangrene of the skin of the penis and scrotum. Streptococci were found in large numbers in all these cases. The condition resembles erysipelas in many respects and frequently begins abruptly with rapid tumefaction of the parts, which later become red and glazed, then brownish and later gangrenous. In this stage evidence of severe toxemia, chills, fever, vomiting and delirium may be present. On incision, the condition is found limited to the skin and subcutaneous tissue with much edematous exudate, widespread thrombosis of the vessels and at times

pus pockets as far forward as the abdominal wall or as far back as the ischiorectal fossæ.

The condition must be distinguished from urinary extravasation, periurethral abscess and the passive edema due to nephritis, cardiac insufficiency, hepatic cirrhosis, Asiatic cholera, smallpox, chronic alcoholism, diabetes, etc.

Treatment should include free incision and drainage with excision of gangrenous tissue. Hot fomentations of 1:500 potassium permanganate may be used both as disinfectant and deodorant. When sufficient recovery from operation has taken place the patient is given a daily hot tub bath for one hour. After subsidence of the infection, the skin of the parts regenerates with surprising rapidity. If necessary, plastic repair may be resorted to after an interval.

A mortality of 20 to 25 per cent may be expected in this condition.

DONALD K. BACON.

PEDIATRICS

SUPERVISORS:

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CHILDREN'S CLINIC, MINNEAPOLIS

ROY N. ANDREWS,

MANKATO CLINIC, MANKATO

ORAL DISORDERS IN PEDIATRICS—Samuel A. Cohen (Amer. Jour. of Dis. of Children, Aug., 1922).

The responsibility of oral diseases must rest on the physician rather than on the dentist, because the opportunity of detecting and preventing potential disturbances comes to him whose contact with the patient commences early and continues with more or less frequency. This is particularly true of the pediatrician, who sees many of the cases shortly after birth and assumes the care of the general condition thereafter. Dr. Percy Howe's animal experiments have shown that lack of proper diet has some bearing on dental ailments, particularly when the teeth begin to loosen. It is thought that the loosening of the teeth may be the result of a drain by the fetus on the maternal supply of phosphorus and calcium. If this supply is not furnished through the diet of the mother, it is natural to assume that the unborn child will suffer, since the mother is required to contribute the necessary elements for the bone and teeth formation.

Formation of Teeth.—Preparation for tooth formation takes place as early as the sixth week in utero, and between the seventh and eighth week, the dental band or ridge is formed. The mother should have a well balanced diet, giving special attention to those foods which contain mineral salts and vitamins. The enamel begins to form on the deciduous teeth about the 17th week in utero. The toxemia of the mother indirectly effects the development of the child. Hence it is important to remove all sources if possible. Continued anorexia leads to defective formation of the teeth in utero. Dental decay is an important

cause of toxemia in pregnant mothers. Pregnancy should be no barrier to dental treatment.

Such defects as chalky appearance of the enamel, pitting, transverse bands on the surface, brown staining of the enamel, irregular and serrated edges are the results of constitutional diseases and malnutrition.

Dentition.—There is altogether too great a tendency to disregard the diagnosis of dentition. It should proceed without any disturbances, but unfortunately, clinical evidence does not always support this view. The symptoms will vary; such as temperature, disturbed sleep, gastrointestinal disturbances (particularly diarrhea), increased salivation and disturbance of weight curve. Convulsions are not uncommon. The gums are often tender, either red or white in color. Otitis media and bronchitis are frequent complications. These symptoms promptly disappear after the cause is removed.

Hygiene of the Mouth.—The epithelium of the infant's mouth is very sensitive to trauma. It has been repeatedly demonstrated that infants who do not receive any mouth cleaning before the eruption of the first tooth show a healthy epithelium and do not suffer from the various forms of stomatitis. A toothless mouth requires no cleansing.

At a clinic held during the A. M. A. in 1921, 176 immigrant children of all ages, all of whom had been in this country less than four weeks, were shown. Almost all nationalities were included. Virtually none of the children had ever seen a toothbrush. Thirty per cent had perfect mouths. In contrast to this, an equal number of children about the same ages, all born in this country, were presented. In this group, a perfect mouth was the exception. A few of the mouths were beyond repair. It has been estimated that 90 per cent of children in the public schools are in need of treatment for carious teeth. The best authorities say that any harm that may possibly result from the extraction of carious teeth is negligible, in comparison to the harm resulting from the failure to extract. No child is too young for treatment. Howe has demonstrated that caries can be prevented and arrested by diet alone. By feeding animals with a diet deficient in vitamins, caries and decay readily follow. Vitamins themselves do no apparent good if there is an insufficient amount of calcium in the food.

Wallace has reported favorable results in children by giving a diet containing hard foods. The more salivary secretion obtained, the better for the food and for the teeth. Acids and highly flavored foods increase the saliva in quantity and in ptyalin content. Dry bread is especially good. Almost all vegetables, cooked or raw, and all fruits stimulate the flow. Moreover, the flow continues for some time after the food is swallowed. It is highly probable that saliva contains a substance or substances to prevent either the onset or the progress of caries. It is interesting to note that saliva of mouths having good teeth has a higher percentage of calcium than mouths which have caries. Foods that are known to be poor salivary stimulants include farinaceous foods, fine white bread, coffee, and particularly sugar and sugar-containing foods.

R. N. ANDREWS.

NEWER ASPECTS OF THE RICKETS PROBLEM— Alfred F. Hess (Jour. A. M. A., April 22, 1922).

Hess points out that the etiology of rickets has been based almost entirely upon hypotheses or general impressions of errors in diet or hygiene, faulty metabolism, inactivity of the endocrine glands, and bacterial invasion, but that during the last few years there has been a new epoch in the history of rickets, due to the increased interest in nutrition, vitamins and the so-called deficiency disorders. Standard diets have been devised which regularly lead to rickets in rats, but which, by simple additions, serve to afford protection. The use of Roentgen rays has also been an advance. Rickets can be prevented or cured by means of light rays—either artificial or sunlight. In Hess's experiments an effort was made to correlate clinical and laboratory observations. It should be borne in mind that the majority of cases are latent and not discernible by diagnostic methods. One of the central points of interest at present is whether the fat-soluble vitamin should be regarded as the antirachitic vitamin. As cod-liver oil is the most potent antirachitic substance it may be stated that the two factors are identical. The fat-soluble vitamin, however, does not play the dominant rôle. Rickets can be brought about by a diet adequate in calcium but deficient in phosphorus. But the very fact that woman's milk contains only about one-fifth as much phosphorus as cow's milk, and that rickets is of far less frequent occurrence among nursing than among bottle-fed infants, indicates that the phosphorus intake does not play the deciding rôle. Animal experiments have emphasized the fact that the requirement of phosphorus (and probably calcium) bears a direct and important relationship not only to body weight and to age but also to rate of growth.

Today the influence of hygiene in the etiology of rickets is firmly established and is identified largely with an adequate supply of sunlight. One must bear in mind the marked incidence of rickets in winter and in spring, and its comparative rarity in the summer. There is no doubt that it is not only a hygienic, but also a dietetic disorder. There are at least 2 other determinants which play a rôle in relation to light—rate of growth and pigmentation of the skin. The atrophic infant, notably insusceptible to rickets, has a far lower requirement for the active light rays than the rapidly growing infant. Colored infants require a greater degree of the effective light rays than do white infants and he believes that the amount of pigmentation of the skin is the determining factor in the absorption of the light rays.

E. F. ROBB.

THE ETIOLOGY OF RICKETS, EARLY AND LATE— H. S. Hutchinson and S. J. Shah (Quart. Jour. Med., Oxford, Jan., 1922).

These studies were made in India, in 1920-1921. Two groups are contrasted: The fairly well-to-do were able to secure a much larger amount of milk and butter than the poorer second group, who subsisted on a diet poor in fats and excessive in carbohydrates, and in the case of whom anemia and scurvy were common. Nevertheless, in the first class rickets was found to be more frequent; in the case of well-to-do Hindus and Mohammedans the per-

centages of rickets were 38.2 and 28.5 respectively; in that of poorer Hindus the percentage of rickets was 6.4.

The reason for this difference lies in the social and economic conditions, and particularly in the custom which keeps the women of the higher stratum, and therefore their young infants, in strict seclusion in houses which are small, dark and ill-ventilated. On the other hand, the poorer classes, men and women together, must labor in the open, taking their children with them, which indicates that the most important etiologic factor in rickets is lack of fresh air, sunlight and exercise. The wealthier classes consume a much greater amount of fat-soluble vitamin, deficiency of which is therefore excluded as the principal cause of rickets.

As to the treatment—all cases treated have yielded to a course of fresh air and exercise, all other factors remaining constant and no medicine being given. Seventeen cases of late rickets are reported, all in females and all but one in the classes observing "purdah"; all these cases began between the ages of 12 and 13 years, when this system of seclusion was imposed. Only one case of late rickets was found among the poor who eat a diet poor in fat-soluble vitamin but who take plenty of fresh air.

E. F. ROBB.

A CLINICAL REPORT OF SIMPLE METHODS IN THE CARE OF PREMATURE BABIES—Walter Lester Carr (Arch. of Ped., July, 1922).

The more premature a baby the more feeble the digestion. Metabolic processes are slower than in a full-term infant and loss of heat is relatively greater. Tolerance for sugar is greater than for fats and proteids. Breast milk should be given if it can be obtained; it should be drawn from the mother or wet nurse, diluted with equal parts of 5 per cent milk sugar solution and fed with a medicine dropper or a Breck feeder. The lower the body temperature the more essential it is that sugar should be added. Premature babies do not bear a high fat and this may give trouble even with mother's milk. If cow's milk is given, it should be boiled and diluted as ordered. Water should be administered freely. Feeding intervals should be about two hours apart and the quantity should not exceed one to two drams at each feeding for the first few days but the feedings must be watched and the amount gradually increased.

Although these babies require a careful food adjustment, their need for the first days after birth is for fluid and this may be supplied in part by sterile water or by a five or six per cent milk sugar solution. Success in management comes largely by reason of a nurse's care and of her understanding of the symptoms of low vitality rather than by forcing of a large amount of food.

Cane sugar is given to babies who have a persistent low temperature and it apparently helps heat production. Lavage and gavage are helpful for babies who take their food slowly and for those who regurgitate. Lavage will lessen and perhaps prevent regurgitation by increasing stomach motility. It is essential to realize that the caloric requirements are high, from 120 to 160 calories per kilogram. The writer routinely keeps babies in the incubator until their weight approximates five pounds but

this is not always possible. As the temperature approaches normal, the babies are taken from the incubators and kept in the nursery, but are replaced in the incubator part of the day.

Premature babies are prone to be rachitic and this should be borne in mind for their later diet.

Finally, the problem of premature babies depends a great deal upon the details of care and nursing. If mother's milk can be obtained, the outlook is much brighter.

R. N. ANDREWS.

THE CLINICAL VALUE OF INTRAPERITONEAL INJECTIONS OF SALT SOLUTION—J. Claxton Gittings and John D. Donnelly (*Arch. of Ped.*, July, 1921). The authors state that in the treatment of dehydration seen so frequently in children suffering from gastrointestinal disorders with diarrhea during the summer months they had found that the most efficacious means of introducing fluid was by the nasal tube, or by intraperitoneal injections. The older methods were either too painful or allowed the introduction of insufficient amounts of water. The intravenous route possesses certain dangers and might well be reserved for other solutions. The nasal tube was found preferable to the stomach tube, because of less danger in causing vomiting. The tube should be only introduced well beyond the epiglottis and not passed through the cardia. This method causes less regurgitation. From 150 to 250 c.c. of water can be introduced two or three times in twenty-four hours. Intraperitoneal injections seem to be safe provided the bladder is empty, and the fluid introduced slowly. The amount injected varies from 150 to 300 c.c. Disturbance of respiration and pulse indicate prompt withdrawal of the needle. Dehydration was determined upon the degree of the loss of resiliency in the skin and subcutaneous tissues when pinched into a fold.

Autopsy upon nine of the patients injected showed that no injury had been done to the peritoneum or any of the abdominal structures. 300 c.c. probably represents a maximum for intraperitoneal injections in infants under one year of age and smaller amounts administered more frequently were safer for infants weighing less than 4,000 grams.

R. N. ANDREWS.

COLIC IN BREAST-FED INFANTS AS A RESULT OF SENSITIZATION TO FOODS IN THE MOTHER'S DIETARY—W. Ray Shannon (*Arch. of Ped.*, December, 1921). For some time it has been held that the diet of the mother could not affect a breast-fed infant. Shannon, in a previous paper, has shown, however, that food taken by the mother may appear in the breast milk and give rise to ana-phylactic reactions in the infants. These reactions may affect the skin, respiratory or the gastro-intestinal system.

He cites six cases of colic in infants due to such reactions. In each case skin tests were done on the infant with foods from the mother's dietary and positive results obtained. The removal of the offending foods caused the disappearance of the colic. In each of these cases egg was one of the foods which caused the trouble; it is noted that egg protein has been responsible for some of the mani-

festations of exudative diathesis in artificially-fed children.

It is concluded that the food allergy demonstrated in these cases is a reasonable basis for explanation of the old statement, "that all breast milk is not the best food for every baby."

A. M. SNELL.

EVIDENCE OF PANCREATIC DISORDER IN RICKETS—E. C. Dodds (*Brit. Med. Jour.*, London, April 1, 1922).

Observers have found that the production of rickets is associated with diet. In this communication the importance of fats and carbohydrates is considered, and new conclusions are drawn. As a result of the examination of cases of acute rickets in children, distinct evidence was found of pancreatic disorder, as determined by an increase in urinary diastase, and in fecal fat content. An increase of urinary diastase was demonstrated, the average in 17 cases was 154; the diastatic power decreased to normal during convalescence. Increased fat in the feces was revealed by a mean of 75 per cent, as compared with 20 per cent for nonrachitic children. From these observations it is suggested that there is a pancreatic lesion in rickets. The large amount of unsplit fat in the feces indicates that it must be associated with reduced secretion of pancreatic fluid. A possible explanation of the bearing of this lesion on the disease is given, i. e., that there is a poor production of fatty acids, and consequently a poor absorption of calcium. The theory is being tested by observation of the effect of fatty acids on calcium absorption, in both rachitic and normal children. Experiments are still in too early a stage to warrant a definite statement. Deficiency of pancreatic secretion suggests a new line of treatment—that of giving a pancreatic extract which contains lipase. Cases are now being treated with this extract, in the hope it will digest fats in the intestine, and thereby produce an adequate amount of free fatty acids for the absorption of calcium. The writer believes that this pancreatic lesion is the result of an intoxication, probably bacterial in origin.

ROOD TAYLOR.

GYNECOLOGY AND OBSTETRICS

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THE TREATMENT OF GONOCOCCAL INFECTION IN THE LOWER GENITAL TRACT OF FEMALE INFANTS AND YOUNG GIRLS—Charles C. Norris, and Henry B. Mikelberg (*Arch. of Ped.*, May, 1922). In the adult there is a definite percentage of cases in which the infection spreads from the cervix to the body of the uterus and hence to the tubes, ovaries and pelvic peritoneum. This upward invasion nearly always occurs at a menstrual period, or after the emptying of a pregnant

uterus. As the child neither menstruates nor becomes pregnant, pelvic inflammatory disease is of extremely rare occurrence.

The chief clinical characteristics of gonococcal vulvovaginitis in the young is its chronicity, its resistance to treatment and its tendency to recur after apparent cure. We have observed many cases that would ordinarily have been pronounced cured, in which the cystoscope revealed a small, unhealed lesion. The cervix, urethra, and, in a lesser proportion of cases, the Bartholin's glands are the harboring places for the gonococcus.

Technic of Treatment. The child is placed on the back with the hips well elevated and the thighs spread widely apart. The external genitalia are cleansed with cotton moistened with a 1 per cent Dakin's solution. The solution is injected into the vagina somewhat slowly, after which the instrument is withdrawn and the labia held together for two minutes.

Intensive treatment of the urethra and cervix is generally necessary during the end stages of the disease, and for this purpose mercurochrome has usually been employed. Dakin's solution does not keep well and if it shows any cloudiness should be discarded. The average period required to obtain a cure was 12 weeks, though some cases were much more resistant. In cases, resistant to the treatment, the vagina is thoroughly cleansed with 1 to 10,000 potassium permanganate solution. This should be done under good illumination, and the vagina dried with cotton, followed by hot air. Thorough drying is essential.

As a final step the entire vagina and external parts are painted with a 1 or 2 per cent mercurochrome solution. The reason for the susceptibility of the vulva and vagina is due to the immaturity of the squamous epithelium forming its lining. The disease nearly always undergoes spontaneous cure prior to puberty, probably in a large measure due to the development of the tissues which occur at that time. This treatment is employed three times a week, and in the intervals the mother applies mercurochrome twice daily.

The more we see of gonorrhea in both the child and the adult the more are we impressed with the fact that the problem is not so much the choice of the gonocide, as is the thoroughness and regularity of treatment in this class of cases.

R. N. ANDREWS.

A PATHOGNOMONIC SIGN OF INTRA-UTERINE DEATH—Alfred Baker Spaulding (Surg., Gyn. and Obst., June, 1922).

Eliciting crepitation of the fetal head bones by vaginal or abdominal palpation is practically the only positive diagnostic sign of intra-uterine death. Spaulding makes use of the x-ray as an aid in the diagnosis of this condition. Very soon after the death of the fetus in utero, the brain tissues shrink, allowing the skull bones to overlap, thus producing a disproportion between skull surface and skull contents. In a live baby, overlapping may be caused by molding but there is no shrinking of the brain tissues, so that the relation between the surface and contents of the skull remains unaltered. He studied 31 cases of

pregnancy. In three of these, symptoms, such as decrease in size of abdomen, absent fetal heart tones, etc., led to the probable diagnosis of death of the fetus. X-ray pictures were taken, and in all three there was overlapping of the skull bones and shrinking of the cavity of the skull. Diagnosis of intra-uterine death were made in all three and dead babies delivered. In all living babies there was no overlapping, except during labor, and then there was no demonstrable shrinking of the cranial cavity.

F. C. GREAVES.

UTERINE HEMORRHAGE OF ENDOCRINOPATHIC ORIGIN—Samuel H. Geist (Surg., Gyn. & Ob., June, 1922).

The process of menstruation is dependent upon, not only the mere presence of uterus and ovaries, but also the proper stimulus from some other source. This stimulus is hypothetically accepted as coming from the ductless glands. While there seems to be no one definite gland responsible in elaborating the stimulus, the presence of functioning ovaries is absolutely essential. The glands of internal secretion form a chain and to have normal menstruation the various links in the chain must be flawless. Geist divides abnormal uterine hemorrhage into the effects of systemic and local manifestations. The systemic conditions are: Cardiac, renal, hepatic, blood diseases, and infections such as scarlet fever. The local conditions are: Local inflammation, malposition, displacements, foreign bodies, tumors and lastly conditions in which no gross lesion is demonstrable. Bleeding due to tumors is divided into two types: those that by erosion of the tumor itself cause hemorrhage, or by pressure cause a vessel in the mucosa of the uterus to be opened; and, second, tumors that are not friable, not exposed to trauma and do not erode the mucous membrane. Under this last group he classifies fibroids. Out of 250 cases of fibroids 192 had a history of a typical bleeding irrespective of size or location. 58 gave a history of no bleeding and were identical in size and location with some of those that did bleed. This fact, Geist thinks, eliminates mechanical factors from consideration. He also studied the 192 cases histologically, and found that in 162 of them there was a marked hypertrophy of the mucosa that bore no relationship to the phase of the menstrual cycle. This was the only constant lesion found and he advances the theory that the cause of the hemorrhage lies in the disturbance of the endocrine balance. Since removal of the ovaries or raying them well causes a cessation of mucosal hypertrophy and hemorrhage, he concludes that local conditions, unless necrosis or ulceration supervene, are due to endocrine disturbance. Likewise the hemorrhage associated with ovarian tumors is thought to be due to the same cause.

In cases of essential uterine hemorrhage the constant findings of hypertrophied mucosa, edema of the stroma, large tortuous vessels, and cystic glands irrespective of the menstrual phase leads him to the theory that the cause lies with the endocrine change and that the fault lies primarily with the ovaries. He suggests the possibility of the mucous membrane of the uterus itself having an internal secretory function but maintains that as yet little is known concerning either its activities or even of its presence.

F. C. GREAVES.

BOOK REVIEWS

BOOKS RECEIVED FOR REVIEW

PRINCIPLES AND PRACTICE OF X-RAY TECHNIC FOR DIAGNOSIS.

John A. Metzger, M. D., Roentgenologist to School for Graduates of Medicine, Medical Department, University of California, Southern Division, Los Angeles. 144 pages. 61 illus. St. Louis. C. V. Mosby Co. 1922. Cloth. \$2.75.

DISEASES OF THE SKIN. Henry H. Hazen, A. B., M. D.,

Prof. of Dermatology in the Medical Department of Georgetown University; Professor of Dermatology in Medical Department of Howard University; Sometime Assistant in Dermatology in Johns Hopkins University; Member of the American Dermatological Association. 2nd edition. 608 pages. 241 illus. with 2-color plates. St. Louis. C. V. Mosby Co. 1922. Cloth. \$7.50.

OBSTETRICAL NURSING. By Carolyn Conant Van Blarcom, R. N., Formerly Assistant Superintendent and Instructor in Obstetrical Nursing and the Care of Infants and Children at the Johns Hopkins Hospital Training School for Nurses. Author of "The Midwife in England." With Two Hundred Illustrations and Eight Charts. The MacMillan Company, Publishers. Price, \$3.00.

The appearance of a book of this type gives real satisfaction to one who is interested in obstetrics or is concerned with the instruction of nurses. It is prepared by an authority thoroughly qualified by years of experience and close contact with the problem from the double standpoint of superintendent in charge of obstetrics and instructor of nurses. The arrangement is orderly. The subjects are presented in good sequence, including anatomy and physiology, normal and pathological conditions. The scope is comprehensive and includes not only excellent theory of various normal processes, but the deviations met in practice. The teaching is orthodox and is presented in a manner easily appreciated by any intelligent student nurse. The aims and objects of various therapeutic measures are simply but accurately explained with ample allowance for special methods of practice of individual obstetricians. The details of special nursing methods are amply discussed but do not duplicate material, commonly found in the ordinary nursing manual.

There is respect for variation in practice in different institutions. On the basis of this book a student nurse should be able to work out an adequate technique for meeting any situation in her work. The style is pleasing and easy. The attitude of the author serves to inspire her students with a high regard for the work. Emphasis is constantly maintained to uphold the idea that the nurse, in order to really succeed in obstetrical work, must bring to it much more than technical skill. Throughout the author presents her material in a manner excellently cal-

culated to inspire what may be termed a high moral tone to the entire subject. The new ideas of pre-natal care, maternal welfare, and public obstetrical clinics, are all discussed. The illustrations are excellent and well selected to demonstrate the anatomical relations and technical methods. The absence of face masks in the illustrations showing normal labor will be noted with surprise by some obstetricians. Prolapse of the cord is discussed on Page 285, but in this connection the author gives no sign by which the nurse will be able to detect fetal distress which will be evident before the prolapsed cord is visible at the vulva.

ARCHIBALD L. McDONALD.

THE WRITING OF MEDICAL PAPERS. Maud H. Mellich, Editor of the Mayo Clinic Publications, Rochester, Minnesota. 157 pages. Philadelphia: W. B. Saunders Co., 1922. Price \$1.50.

This small and concisely written book is a veritable godsend to the profession and more particularly to authors of medical papers, proof-readers and editors. While its author may be accused of being too arbitrary in her statements, rules of punctuation, spelling and form are largely the results of good usage and we know of no one in a better position to postulate what good form is.

To anyone about to write a medical paper, we strongly recommend the reading and rereading of this short book and then placing it with his dictionary for frequent reference. Certain chapters while dwelling on dry subjects are, because of the author's characteristic dry wit, very entertaining; the reader is warned, however, that much of the book is full of meat and should be taken in small amounts to avoid intellectual confusion.

C. B. DRAKE.

LOCATIONS

Physician Wanted at Hitterdal, Minnesota. Thriving town of 300. In potato district of West Central Minnesota. Scandinavian community. Have drug store. Write Adolph Herseth, President Commercial Club.

Wanted—A good location in Minnesota town of not less than 800 by young, well-trained physician. Must be in good farming community with 98 per cent collections. Address B-42 MINNESOTA MEDICINE.

Graduate nurse would like position as laboratory technician. Has had several years experience in obstetrical and surgical nursing. Address B-43 MINNESOTA MEDICINE.

There is an opening for a physician at St. Hilaire, Minn., as the local physician is leaving. Address A. F. Hall, Farmers State Bank, St. Hilaire, Minn.

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ORIGINAL ARTICLES

PROBLEMS OF THE MEDICAL PROFESSION, PAST AND PRESENT*

J. FRANK CORBETT, M.D.

Minneapolis

In choosing a subject on which to address you, in place of some attempt at a scientific dissertation I have decided to talk to you about the doctor in a very general way. Like all other callings, it is rather common for the medical profession to consider themselves a peculiar people, set aside from the common herd, and possessed of special traditions, qualifications, and privileges. History tells us plainly that the medical profession of the ages has only been a part of the age in which its members lived, and that the standards of our profession have been largely gauged by the general state of learning, or, in some instances, of prejudice, superstition, and madness, common to most people at the particular time we have under consideration.

Chaucer's doctor (1340-1400) was a product of his time, deporting himself as though perfect in the art that no one has ever mastered, believing in the influence of astral bodies, thoroughly versed in Esculapius, and best described in the words of the poet himself:

"Wel knew he the olde Esculapius,
And Deiscorides, and eek Rufus;
Old Ypocras, Haly, and Galien;
Serapion, Rasis, and Avicen;
Averrois, Damascien, and Constantyn;
Bernard, and Gatesden, and Gilbertyn.
Of his diete mesurable was he,
For it was of no superfluitee,
But of greet norissing and digestible.
His studie was but litel on the Bible.
In sangwin and in pers he clad was al,
Lyned with taffata and with sendal;

And yet he was but esy of dispence;
He kepte that he wan in pestilence.
For gold in phisik is a cordial,
Therfor he lovede gold in special."

The conceits of this man did not die with him, and even the people of today thoroughly believe the last two lines. The following quotation from Bell's Principles of Surgery, printed in 1801, describes a state of mind of both the medical profession and the world at large during the middle ages.

"In hemorrhagy they tried rather to divert the blood than to stop it directly; they applied cupping glasses near the open vessels; put ligatures around limbs, made strong friction, or opened a vein in some distant part of the body; they operated from right to left, not diagonally but according to direct line of the body. The body of a bleeding chicken was used to control hemorrhage, as the following tale records:

"The villain was taken and condemned to be divided into quarters for the benefit of the whole city, but before this he underwent the following initiating ceremony. He was carried to the square where he had committed the murder and there the hangman cut off his right hand with an ax; but lest he should die of the hemorrhage the hangman's wife, in whose lap the thief sat during his progress, took a live fowl which she had provided, cut it up with a knife from gut to breast bone, thrust the bleeding stump into it and tied it firm and hooped it on with garters like a boxing-glove. He was dragged on the hurdle for a full hour before he arrived at a spot where he was to finish his career, and to the admiration of Plateus he lost not one drop of blood."

"Favorite remedies were iron ore, 'Hematit,' whose very touch suppressed bleeding; live toads tied on a string about the neck behind the ears; or moss from a dead man's skull. Michael Mercatus says the effect of toads is a truth of which any person willing to take the trouble may satisfy himself by a very simple experiment. If you hang a toad around a cock's neck for a day you may then cut off his head and it will not bleed. Wolfius, Senertus, Mercatus, Hoffmann, Moebius do diligently commend the toad. Wolfius believed moss from the skull of a murderer was of most use to physicians."

"It was natural for the Arabians to adopt the farrier's cautery, a device that probably had its inception in some blacksmith shop of the distant past. The heated iron, 'Sceptrum ad restringendum flexum sanguinis,' was the resort in case of extremity. From actual cautery it was natural to proceed to use substances which had a similar

*Presidential Address before the annual meeting of the Minnesota State Medical Association, Minneapolis, October 13, 1922.

operation, caustic and hot oil, so-called potential cauteries. Melted lead, boiling oil of turpentine, blue vitriol in small linen sacks were standard remedies. Of the sudden hemorrhagy which followed these procedures thousands died, while few escaped a dangerous loss of blood and repeated cauterizing for many successive dressings. Sir Kenelm Digby's (1658) sympathetic powder staunched blood as well when applied to weapon as to wound."

In this connection it must be remembered that Celsus had lived and written before this. And the teachings of Celsus, far above the practices of the middle ages, were truly representative of the time in which he lived. Our quotation gives us some idea of the condition of human mind when Ambrose Paré came upon the horizon. Such men as Paré (1510-1590) and Harvey (1578-1657), transcending in clearness of vision, accuracy of observation, and soundness of logic, untrammelled by tradition or prejudice, stand as beacon lights through the ages.

The centuries preceding 1500 had produced but few really illustrious names. The sixteenth century brought Paré and Harvey in medicine, Versalius in Anatomy (*De Corporis Humana Fabrica*); and in other walks of life gave us such names as John Knox, St. Francis Xavier, John Calvin, "Blessed" Thomas More, Martin Luther, Gerardus Mercator, Sir Francis Drake, Cervantes, Sir Walter Raleigh, Edmund Spenser, Francois Rabelais, Francis Bacon, de Vega, William Shakespeare, Christopher Marlowe, and Ben Jonson. Eustachio Bartolomeo and Fallopio Gabriella must not be forgotten. Michelangelo, Titian, and Raphael were painting immortal pictures. The general awakening of humanity had occurred in other lines of work a little before Harvey and Paré; so, again, these men represented the great general awakening of the times.

Molière (1622) exposed the vices and foibles of his day. And, like even princes and potentates of his day, the doctor is unmercifully grilled. However, when we read Molière let us remember that about this time a monster by the name of Jeffreys, who executed Dr. Bateman for the crime of bathing the wounds of Titus Oates and who strewed England with corpses and covered the land with gibbets erected for the execution of innocent people, was Chief Justice of England. If Molière's criticisms or caricatures were true, then the doctor of his time was the product of his time. Molière's dramas reflect a general state of mind rather than any peculiar trait of the medical profession. Utter

credulity combined with such lack of integrity that the patient often deceived his medical adviser, willingness to accept miraculous tales of healing on the part of the public, all left their imprint upon the doctor of this period. Molière's witticisms had their justification in the absurd practice of medical men of that time and their adherence to misconceived principles such as various humors and spirits, generation of heat in the heart, and putrefaction of humors. Chicanery properly belonging to the middle ages is still practised, for the simple reason that it is still demanded and expected. I will quote a few random lines from Molière: "I think I had better stick to physic all my life. I find it is the best of trades, for whether we are right or wrong we are paid equally well. We can spoil a man without paying one farthing for the damage done." Please remember these words were uttered by a conception of Molière's, a quack, who, without any medical training, assumed the rôle of doctor. He was sustained by Lisette, who is made to say, "I know a man who could prove with good reason that we should never say so-and-so died of a fever or pleurisy but of four doctors and two apothecaries."

From the drama, "The Doctor, In Spite of Himself" (*Le Medicin Malgre Lui*), I will make a brief synopsis. Sganarelle, a woodchopper, is forced to assume the rôle of a doctor, after a most urgent persuasion with a club. His first patient is a young woman who had become speechless. He is told this. Fearing another beating, he visits her in the robes of a doctor, feels her pulse, diagnoses mutism, of which he had just been told, and mystifies his hearers. Informed by Leandra that the illness is feigned by the girl to avoid a hateful marriage, feeding her bread and wine he cures her miraculously by uniting the desired man to the girl. Sganarelle again impersonating the doctor, and mistaking the father of the girl to be his patient, gets out of the dilemma with the following words: "It does not matter, the blood of the father and that of the daughter are the same, and by the deterioration of the blood of the father I can know the illness of the daughter." He further says, "I am the greatest, the cleverest, the wisest doctor in the vegetable, animal and mineral faculty."

Following Paré and Harvey there seemed to be a recession in medical science. In 1731 the Academy of Surgery, under Jean Louis Petit, came into

existence and surgery took an honorable place beside medicine. Before this both "long gown" and "short gown" surgeons were held in but little esteem. Lorentz Heister (1623-1758), Boerhaave (1668-1738), Von Heller (1708-1777), John Hunter (1728-1793), John Bell (1763-1820) and Percival Pott contributed much to the development of the science of surgery in this transitional period.

A little later on we are wont to dwell on the work of Jenner (1749-1823). The prophetic paper of Oliver Wendell Holmes on Puerperal Fever was published in 1843. The name of Beaumont (1785-1853) stands out. Beaumont, in an isolated army post, gave us a knowledge of the digestive function that has stood ever since. We clearly realize that these men had a prophetic vision; that they visualized things that were true without methods of scientific analysis. Their sound reasoning, close observation and careful compilation were their only means to a conclusion. Time and instruments of precision have validated the work of these men. Let us not forget that with the exception of Harvey most great discoverers have been bitterly fought by their contemporaries. However, these men, I believe, represent in medicine the dawn of the golden Victorian age that was about to come.

Lister lived from 1827 to 1912. Modern surgery dates from Lister. Aseptic and antiseptic surgery made the use of the ligature safe, the control of hemorrhage certain, and permitted exploration of all the body cavities. Pasteur (1822-1895), a chemist, a man upon whom the geologists have as much claim as the doctors, contributed materially to Lister's principles, although Lister seems to have anticipated Pasteur. In substantiation of this statement I am going to read the following list of papers, together with their dates. Lister published a paper on the "Antiseptic Principles of the Practice of Surgery," in 1867, and numerous articles upon the same subject in the *Lancet* of the same year. Pasteur had contributed a communication on "Fermentation" in 1857-58. He further contributed a paper on "The Germ Theory and Its Application to Medicine and Surgery," but not until April, 1878. Another paper, "On the Extension of Germ Theory to the Etiology of Certain Common Diseases," was published by Pasteur in 1880. Pasteur himself prophesied that Lister had established a new field of surgery.

The doctors portrayed by Dickens amuse us. Possibly they represent the profession of the early

forties. Dickens was keen to portray the petty foibles and personal characteristics of medical men. About a dozen varieties of medical men have been described by him. Their relation to the ideal medical man is about in proportion to that of a shyster lawyer Dickens describes to an advocate today. Dickens' indictment of the medical profession was less severe on the doctor than upon almost any of the other professions or vocations he portrays. It is my opinion that the English people of Dickens' time needed some pretty severe jolts.

It is indeed not strange that the Victorian age, the age of altruism and sincerity, should at last have brought forth such men as the portrayed doctor of the old school, MacLure. I graduated at a time when this book was new, and I sometimes have felt that it influenced the generation of men that followed. It is more probable that Ian MacLaren's pictures were only reflections of the times. For it has been my very good fortune to know many men of Dr. MacLure's type in so far as they were men of integrity, endowed with sound judgment, and thoroughly imbued with the sense of duty to the welfare of their patients. These men did not come from any one country. Scotland, Germany, Japan, France, Switzerland, Italy, Canada, and the United States have produced this sort of product. The Victorian age produced Florence Nightingale, who made the intelligent care of the sick possible. Soon the discoveries of Lister, Morton, Simpson, together with Virchow, the pathologist, became generally used.

The names of men in the medical profession of the Victorian age who have made indispensable contributions not only to science but to the relief of mankind as well, make a very long list. For the recognition and cure of syphilis we recall Hoffman and Schaudinn, Wassermann and Ehrlich; for all that x-ray implies, Roentgen; for the discovery of the underlying sense of position in space, Baranay; for the eye, Fuchs.

Bier, Israel, Korte, v. Bergman, Mikulicz, Schleich, v. Bardenheuer, Krause, Heinrich Braun, Wilms, v. Bruns, Kummel, Wertheim, v. Eiselsberg, and Sauerbruch stand for surgical advance in Germany and Austria. Scandinavians have given Lenander, John Berg, Ackermann, and Rovsing. Switzerland brings to our mind the names of Kocher and Roux with the pathologist Langhans. England gave MacEwen, Moynihan, Jones, Watson

Cheyne, Mayo Robson. France has produced Tuffier, Duval, and Doyen in surgery, and Laveran for the cause of malaria. International medicine brought forth Sali and Osler and Strumpl, names too great for any one country. Bacteriology has been applied to medicine by Koch, Ehrlich, and Behring. In America, Ephraim McDowell, Marion Sims, J. C. Warren, L. A. Sayre, Valentine Mott, Willard Parker, McBurney, W. H. Pancoast, Roswald Park, Austin Flint, John B. Murphy, Nicholas Senn, L. Gross, Horace Wells, Jacob Biglow, Christian Fenger, Henry Bowdich, B. N. Dudley, Trudeau, Flick, O'Dwyer, Carroll, and Stiles, as pioneers, have all contributed foundation stones to the magnificent institution whose purpose is the relief of mankind. I will not include the host of Americans working and writing today, with whose names you are all so familiar,—and partly because their work is in such close perspective. This patchy attempt to give the names of men is but a hasty effort and therefore incomplete.

While reviewing the work of our early American physicians and surgeons one is impressed with the direct manner in which they attack the problem before them. Their description often lacks the beautiful phraseology and graphic descriptions one finds in Sydenham's or Bell's writing. In a simple, direct manner they tell how they developed some new procedure that cured the patient and laid the foundation for further progress. Ether anesthesia, ovariectomy, animal ligatures, appendectomy, nephrectomy, cholecystectomy, intestinal anastomosis, cure of vesico-vaginal fistula, plaster jackets and casts, intubation for diphtheria, operations for epilepsy and brain abscess, application of extension in fractures, skin grafting, and eradication of yellow fever and hookworm are the achievements of these men.

It is not strange, though, that the caricatures of the profession should stand out above all their meritorious work in the minds of the laity. It is to be expected that many people should mistake the absurd situations and utterances coming not from the doctors but from actors playing a false part to be the principles of the medical profession.

Self-conceit, secrecy, and unwillingness to confide in our patients still persist, and have contributed much to make the world believe that a doctor loves gold; that he is a member of a closely affiliated medical trust; that he is bound by that

mysterious thing known as a code of ethics, whose chief function is to cover incompetence that may be perfectly apparent to him. Some go so far as to even believe that the doctor is an executioner both of life and morals—further than this, to believe that the obliquities of mental vision in the past were peculiar attributes of the doctor. We are partly to blame for this. We should not permit people to lie about us with impunity. Before continuing on this line further I wish to return to my chronological plan.

We will now consider the doctor of the present day. When I spoke of the Victorian age I did not have in mind the exact period of time in which Victoria lived. I had in mind that the spirit of the Victorian age lasted until 1914. In that year the furies of hell were let loose. The war has been followed by the usual physical and mental deterioration that almost always comes. New problems confront the doctor. We speak of unrest and attribute many of our difficulties in every walk of life to this. What is unrest? It is a protest to establish the equality of men dreamed about since the days of Thomas More. But Thomas More either did not recognize the fact that all men are not equal, or he hoped in some way to produce a perfect race of men. There are no supermen, very few 100 per cent men, and a great many that hardly can be called men at all, if we consider man to be endowed with an intellect. Unrest is really a dissatisfaction with oneself or rather with one's possessions, and a desire to so change things that the environment be made to fit the individual rather than the individual master the environment. The products of unrest are departures from normal standards, dissatisfaction with existing conditions, desire to get the good things of life whether or not one has the necessary ability to exchange for them, disorganization, letting loose selfishness, unjust supremacy of the individual. Let us see what Utopia means when mankind is not yet sufficiently developed. I can illustrate this by the story of a dentist in Russia, graphically described in a series of articles by Eleanor Franklin Egan. Before the Russian Utopia this dentist had practised his profession with profit and honor. After it, he was compelled to live in a dirty room, to practise his profession, live, and study in the same filthy hole. They did allow him to boil his instruments in an old kerosene can with a little charcoal under it. That is the sole perquisite of his profession. His

property was taken away from him. His services belonged to all; everyone was entitled to them whether they had money or not,—hence he could demand no pay. On the other hand, materials for his maintenance were only to be obtained by paying a price. I hope that our most enthusiastic reformers will not put the medical profession in such a hole. This unrest makes the laborer begrudge payment for medical services, and he is perfectly willing to kill the goose to get the golden egg. Medical men do get large fees, but the acquirement of the ability to carry on the work costs many all they get. The public should understand the reasons for the “high cost of getting well.” The profession has been profligate in its charities and some limit must be established or efficiency will be lowered.

I will next take up the questions that more particularly deal with our profession. The doctor is not particularly concerned with the numerous irregular “healing” methods because all through the ages he has known that quacks have blossomed for a time and then withered like weeds. This is true not because truth is supreme but because the quacks were not organized and the medical profession was. However, the organization of the medical profession today is largely on altruistic and educational lines. The American Medical Association is organized to fight things harmful to the public at large, to maintain educational standards and to demand efficiency on the part of the doctor. As a parental advisor it has not done so well. The medical graduates should be so controlled that efficiency is maintained. The recent graduate formerly went into the country and practised. He there learned his capacity or his limitations. He also made friends with the people and came in close personal touch with them. In course of time, if his general medical judgment was good enough to warrant it, he turned his attention to a specialty and, carrying his friends from the country to the city, he established himself there. Such was the life of our beloved James Dunn, and Nicholas Senn, and many others. Today a very large percentage of the recent graduates go immediately into specialties. The technique of the specialty is easy to learn; but the specialist must know the working of the very delicate machine we call the human body, and he must know that our art and our materials are very crude. The result of this is a very large number of technically trained

specialists and a dearth of country doctors. A community with no doctor takes up with some other healer,—maybe a quack, maybe an honest man although not an M. D. His close contact soon makes him friends; and yet we wonder why legislatures do not recognize the solid worth of our profession. Not only this, the doctor is sometimes too lazy or too exalted to render close personal service that is just as necessary for his patient as a high sounding Latin label applied to his cases. New York state has 2,500 chiropractors and about 16,000 medical men. Twenty-five different varieties of non-medical healers exist. Not only so, but in addition every cult has its propaganda.

I recently read a letter from a quack whose chief qualification was cleverness with a typewriter. He had written to a young man who contemplated studying medicine. He plead with the boy to not so far debase himself as to enter the fold of such an abominable lot of creatures as the medical profession. These men, guilty of murder and abominations of all kinds, of booze-selling and dope-peddling, and almost all the crimes of the calendar, should not claim so decent a boy. If he must have money, let him study law or dentistry. These professions were somewhat respectable. This letter seemed, to me, humorous but it would just about win the heart of a good many people. I am sure of this, that the general influence and standards of the medical profession are such that we will have but few like Friedmann or Abrams, and I hope none.

There is also a feeling that the American Medical Association is not a representative body. Let us, in our own state, look into the foundation there is for that feeling. To do this we must indulge in a few figures. Population of Minnesota is given as 2,386,371. Number of counties, 86. Counties represented in component societies, 76. Number of societies, 37. Number of members, 1,602. Total physicians in the state, 2,628. This, on paper, looks good. But how do our delegates to the A. M. A. know the sentiment of its members? Only through the state house of delegates. How do the delegates themselves know their constituent societies? Only through the activity of the county societies. Then the policy of the American Medical Association should be dictated directly by the doctors. But the last link in the chain is a very weak one. Let us see why. I quote a letter that is illustrative:

August 3, 1922.

"Dear Dr. Savage:

"You have not heard because the secretary and myself have tried for over a year to get a meeting and we cannot get enough together. The Southern Minnesota and Central Minnesota societies have killed our local—dead—deader—deadest.

"If these three do not perfect or cooperate with a state organization at once, medicine will be lost in the legislature. It will have no voice to make appeal or demand.

"I wish you would pick out and request any member of our members to act as your committee. I will sign whatever is necessary. I would suggest Dr.—— of —— as chairman.

"What program are you going to inaugurate to save the local Minnesota Medical societies. They are doomed under the present conditions.

"Very truly yours,
 "(Signed)———."

The societies mentioned in the above letter are pre-eminently scientific bodies not especially concerned in the practical problems of the profession. The county society should know the practical problems confronting the profession and by earnest effort do their part. The only way to make the American Medical Association a representative body is for each county society to awake to our real problem and do their duty. It is that lack of interest in the problems of the day that handicap the splendid work of the legislative committees, most vital to a successful campaign.

In closing, I want to say that the medical profession must remember that the golden days of Victoria are past, that we are living in an age of unrest, and the only possible remedy for the prevailing evils is cooperation and organization. The legislative committee has prepared a bill for the protection of humanity. Incidentally this vitally concerns the welfare of the medical profession. This bill will not pass the legislature unless intelligently supported by the medical profession. To do efficient work the county societies must not only be organized on paper (Dr. Savage informs me that thirty of the constituent societies are so organized) but must realize the problems that confront them and leave no stone unturned in the campaign. An awakening of the medical profession to its own mistakes in public policies must occur and a new spirit of enthusiasm and interest must be evoked.

THE DIAGNOSIS OF FOCAL INFECTION*

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The diagnosis of focal infection may be conveniently grouped under the following heads, as to whether the infection is: (1) acute, subacute, chronic or latent; (2) local or constitutional.

A focus of infection anywhere in the body may be primarily acute, as, for example, a tonsillitis. A latent or chronic focus of infection may become acute, as, for example, the redness, pain, swelling and fever that sometimes follow the prompt filling of a root after the removal of the pulp, the immediate causes of which are traumatism from preparing and filling the root canal, and the entrance of air inducing a change in oxygen tension. Acute infection may be secondary to a chronic or latent primary focus as, for example, a severe acute cholecystitis, secondary to chronic periapical dental infection.

The diagnosis of *acute* focal infection is usually comparatively easy, especially when the infection is located in the teeth, tonsils or superior maxillary sinuses, and ordinarily gives no great difficulty when situated in one of the remaining sinuses or mastoid.

A *subacute* focus of infection is usually afebrile, and presents an indefinite and variable group of symptoms, as, for example, a recurrent furunculosis, secondary to a pyorrheal pocket shut off from the buccal cavity. In acute and subacute focal infection, there may be a slight polymorphonuclear leucocytosis, whereas, in chronic focal infection there may be a lymphocytosis, a decrease in polymorphonuclear cells and a leucopenia. When the focus of infection is local, the organism only mildly pathogenic and the defense system of the body excellent, the blood may be normal.

Chronic focal infection frequently exists without recognizable symptoms, and the region affected may show nothing of diagnostic importance unless a special effort is made to secure certain signs of more or less diagnostic importance.

In chronic ethmoidal and sphenoidal sinusitis,

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the first examination may be negative, and repeated examinations may show on one occasion a purulent discharge containing hemolytic streptococci. An examination of the secretions obtained by irrigating the sinus and a roentgenogram are important aids in diagnosis. The diagnosis of infection of the antrum of Highmore is usually easy.

Latent focal infection may be local and only occasionally constitutional, is usually of long standing, producing indefinite symptoms of ill health and susceptibility to disease, especially catarrhal inflammation, and is usually diagnosed bacteriologically or by the presence of lymphocytosis, decreased polymorphonuclear cells and leucopenia. Focal infection is local when the infection is shut off from communication with the body. Many local infections are now known to be intermittently or continuously constitutional. Focal infection is constitutional when toxins or organisms or both enter the blood. Occasionally the *only* diagnostic sign that a focus of infection is producing systemic effect is lymphocytosis, decreased polymorphonuclear cells and leucopenia.

Most foci of infection are in the cavities of the head, and are usually dental after middle age and tonsillar in the young.

When multiple foci of infection exist in various parts of the body, one or more are apt to be overlooked. Unfortunately, many physicians are satisfied when they have discovered *one* focus of infection, whereas multiple foci are common. Many physicians experience mental difficulty in comprehending that a *small* infection around a single root of a tooth, or a remnant of diseased tonsil no larger than a pea, is capable of causing serious or fatal disease of an important or vital organ. They believe that diseases so important as arthritis, myocarditis, cholecystitis, peptic ulcer, appendicitis or nephritis, must be due to a *large* focus of infection, despite the known fact that there need be no relationship between the *size* of the focus and the seriousness of the secondary disease, but that the virulency, pathogenicity and selectivity of the organism and toxine, its entrance into the circulation and the susceptibility of the patient, are the governing factors, as has been so well proven by the brilliant researches of Dr. Edward C. Rose-now.

The belief that foci of infection must be purulent is still prevalent; nevertheless, it is definitely

known that many dental foci of infection contain *no* pus and are composed of pathogenic organisms.

The influence, upon the course of focal infection, of intercurrent infections or gradual or sudden diminution in resistance, is still not fully understood.

Many dentists hold the erroneous opinion that a devitalized tooth, with an area of rarefaction around the apex of the root, causing *no* subjective pain nor pain on pressure over this root, *excludes* infection. Many laryngologists are disposed to attach *no* importance to small remnants of tonsils left after a tonsillectomy, largely because of the *small* amount of tissue present, again illustrating the erroneous belief that a *small* amount of infection is incapable of doing a *large* amount of harm. The diagnosis of a focus of infection in the ethmoid or sphenoid may be difficult, but failure may be due to an insufficient number of re-examinations, or from omitting x-ray evidence.

Infective mastoiditis in the young, causing but few symptoms, frequently escapes diagnosis until the classical or what should be called the terminal symptoms appear.

When foci of infection exist simultaneously in different parts of the body it may be easy, difficult or impossible to know which is primary, as it is evident that any one of the foci may be primary or secondary. An infected tonsil may cause a sinusitis or a periapical infection of a devitalized root of a tooth and, vice versa, an infected root of a tooth may cause tonsillitis or sinusitis. A pyorrheal pocket around the lower third molar may cause tonsillitis by contiguity.

After the removal of a primary focus of infection the secondary focus may become primary.

Chronic or recurring myocarditis or cholecystitis may improve or disappear after the complete removal of the primary focus.

Non-Neisserian prostatitis is usually a secondary manifestation of focal infection and recurrences are common if the focus is overlooked, and recovery may occur if the primary focus is removed. It is probable that many cases of idiopathic enlargements of the prostate are due to unrecognized chronic focal infection.

Teeth.—Statistics show that 80 per cent of devitalized teeth are infected, and it is probable that many of these teeth were infected from the carious

process that necessitated the filling of the tooth and not that these teeth were infected by the dentist, although this also occurs. Neglect of the surgical principle that infections should be drained and not sealed has been the great error of dentistry. It is also true that properly filled devitalized teeth may slowly recover and later show no evidence of infection, but a subsequent infection from a focus of infection located elsewhere as, for example, in a pyorrheal pocket, another tooth, the tonsils or sinuses, may infect, by preference, the devitalized tooth. The proof of the infectivity of a tooth rests upon the classical symptoms and signs of systemic infection such as polyarthritides, tenosynovitis, myositis, neuritis, etc., with or without fever, in conjunction with lymphocytosis, a decrease in the polymorphonuclear cells, and leucopenia, and by identifying the organism from a culture. The pathogenicity of the organism may be determined by its effect upon a mouse, rabbit or guinea-pig. Clinical evidence is easily secured but the obtaining of materials for bacteriological evidence is difficult.

The small size of the pulp canal and the frequent occurrence of curved roots, usually make it impossible to secure materials from the periapical space for examination. Occasionally when an infected tooth is extracted, materials for culture may be obtained from the adjacent suspected root by curettage. On the whole, however, it is practically impossible to identify the organism before extracting infected teeth. Clinically it is important to state that very rarely, in my experience, is a tooth *suspected* of being infected, that does not show a pathogenic organism when removed.

When infected teeth are to be extracted, the physician and the exodontist must decide as to the anesthetic (gas, ether, local anesthesia or nerve blocking), the order in which the teeth are to be extracted, the number of extractions at one sitting and the interval between the extractions. If many diseased teeth are extracted at one sitting, serious systemic infection or death may follow. The bacteriologist should be present at the time of the extraction, so as to secure materials for culture as free from contamination as possible. If many teeth are to be removed, a prosthetic dentist should be consulted before the extraction, in order to determine the usefulness or uselessness of certain teeth from the standpoint of an artificial denture. It is often necessary to make a temporary

plate before the extraction, in order to preserve appearances. Team work and frequent consultations are necessary in order to secure the best results.

The most frequent location of foci of infection after middle life is in the periapical dental region. Rarely is a vital root infective, although occasionally the region about the roots of a vital tooth may be infected from diseased adjacent roots. Occasionally the pulp in a sound tooth dies from unknown reasons, so that the absence of caries does not prove that the tooth is vital. The vitality of each tooth should be determined. Caries is the usual cause of devitalized teeth and in the past, unfortunately, many teeth have been devitalized in order to make abutments for bridges. It is *not* generally known that the root of a devitalized tooth is a favorite location for secondary infection, usually by the blood route, from infected teeth in other parts of the mouth, occasionally by contiguity, or from foci in other regions of the body.

As a rule, periapical dental infection exists without local symptoms. An alveolar abscess that freely drains usually causes no systemic infection. In certain cases of dental infection that have existed for ten or twenty years, subacute local symptoms may occasionally occur, but as a rule this form of chronic focal infection is without local symptoms. The dentist, having determined that the suspected tooth is devitalized, and if the root is not properly filled, may remove the pulp, fill the root canal, and if pain and swelling follow, and last more than a day or two, these symptoms may be interpreted as indicating preexisting infection.

A roentgenogram of *all* of the teeth and of the jaw where there are no teeth, is of great importance diagnostically, and the films should be arranged in two horizontal rows, in their normal anatomic relationship, and marked "left" and "right," so as to facilitate the study of each tooth and each root.

Many roentgenograms made by the average roentgenologist or dentist are unsatisfactory. The films are frequently so dark that it is impossible to detect small areas of rarefaction, the size and shape of the teeth may be grotesquely enlarged or the tips of the root may not appear on the film. A properly made roentgenogram should show with great definiteness the periapical regions, the alveolar processes, the relationship of teeth to each other, the presence of unextracted roots and im-

pacted or unerupted teeth and region favorable for the development of pyorrhea. As the roots of bicuspid and molars vary in length and direction, and one may be superimposed upon another, certain teeth require that additional films be made at different angles.

A typical area of refraction around the apex of a devitalized incisor or canine is highly diagnostic after due consideration has been given the history of the tooth, but owing to the increased thickness of the ramus of the jaw in the region of the molars, the increased amount of lime salts sometimes prevents the ray from showing areas of rarefaction around the roots of these teeth, so that the *absence* of areas of rarefaction in these regions is sometimes associated with well marked periapical infection. It should never be forgotten that a negative radiogram does not exclude infection. Occasionally infection occurs in an unextracted root or an unerupted tooth, and sometimes an area of infection occurs in the crotch between the roots of a cuspid or molar that cannot be revealed by the x-ray.

The mental foramen may sometimes be so situated on a film as to simulate an area of rarefaction around the tip of the root of a tooth.

A rather large experience shows that seldom is a tooth extracted unnecessarily, but, on the contrary, infected teeth often remain undiagnosed, even after the most minute and careful search.

A devitalized tooth is always predisposed to reinfection and is a constant menace.

Bacteriology.—The identity of micro-organisms is important in diagnosis, and a vaccine made therefrom may be valuable therapeutically. Most of the bacteriological work done under ordinary circumstances is very misleading, owing to carelessness in securing materials for culture, an undue loss of time, or carelessness in caring for the material before culturing, exposure to sunlight, desiccation, improper preparation of the specimen for transportation, the selection of media unsuited for the growth of the organism, or lack of knowledge in identifying organisms under scientifically exact conditions.

The crown of the tooth to be extracted is thoroughly cleansed, walled off by cotton from the buccal cavity, iodine is avoided, the tooth is then extracted with the minimum of injury to the al-

veolar processes and in such a manner as to prevent the root from becoming contaminated. Cultures should then be made from the roots immediately after extraction and if the tip is occupied by a granuloma, it is incised and a second culture made from its contents. The entire tooth is then placed in a culture tube. Immediately after the extraction of the tooth the dental surgeon lightly cures the socket and the material thus secured is cultured. Various media are employed, the most satisfactory being blood agar. When the root of a tooth breaks the distal portion remains in the socket, it is impossible to make a culture without considerable contamination, whereas materials secured under favorable conditions often show almost a pure culture of the organism, with only a few contaminating organisms. One of the most important elements of this technique is that the bacteriologist, and the exodontist should work as a team, at the time of the extraction. When infected teeth or materials are secured by the dentist and placed in a culture tube and sent to a laboratory, a number of errors may occur which may prevent the bacteriologist from determining the predominating organism.

In my experience, the *streptococcus hemolyticus* occurs most frequently, the *streptococcus viridans* less frequently, and the ordinary *streptococcus* occasionally. In the mid-west I am informed that the *streptococcus viridans* is more frequently found than the *streptococcus hemolyticus*.

The vaccine is made from the predominating organism and the contaminating organisms are excluded. A vaccine made under these conditions possesses value, more especially to patients advanced in years, and in those whose defense system has been weakened by infection of many years duration, or by disease of vital or important organs. In young vigorous patients vaccine may be unnecessary.

Pyorrhea.—Pyorrhea is exceedingly common in adults, more especially after middle age, and almost always occurs when capped teeth or bridges are present. After many teeth are extracted, the unopposed teeth and those that have changed their direction are prone to pyorrhea. Ordinarily pyorrhea does not produce systemic disease. When, however, a pyorrheal pocket is formed beside a root, penetrating almost to the tip, and, owing to its location or obstruction is unable to drain, sys-

temic manifestations are common. When a pyorrhea pocket or an alveolar abscess drains freely, the process usually remains local, and seldom produces systemic disease. A focus of infection so located that it is shut off from the air usually contains micro-organisms possessing marked pathogenicity and selectivity. Rosenow has shown the extraordinary influence of varying oxygen tension in the production of virulent organisms. The diagnosis of pyorrhea as a focus of infection can usually be easily made by direct examination by a skilled dentist, aided by a roentgenogram.

Tonsil.—Although it is true that the tonsil is frequently a focus of infection in the young, it must not be forgotten that latent chronic infective tonsillitis is very common in middle age and advanced age. In early life the local and constitutional symptoms are apt to be frank, whereas late in life local symptoms are apt to be absent, but the systemic symptoms and signs may be typical. The diagnosis of acute tonsillitis in the young is easily made, and when systemic manifestations occur they are characteristic, the commonest syndrome being polyarthritis with fever, usually remittent, with evening exacerbations associated with sweating, with or without endo- or pericarditis, in association with a history of one or more attacks of acute tonsillitis. The tonsils are usually considerably hypertrophied and from the crypts may be expressed a thin milky fluid containing a streptococcus, usually of the hemolytic or viridans variety. Occasionally the cervical lymphatic glands are painful and swollen and a leucocyte count usually shows a polymorphonuclear leucocytosis.

In adults and late in life the systemic symptoms of tonsillar infection are usually less acute and fever is absent. Arthritis is usually sub-acute and more apt to involve the smaller joints. Myocarditis is more common than peri- or endocarditis or endarteritis. Occasionally, the *only* manifestation is one of the following diseases—cholecystitis, nephritis, pyelo-nephritis with or without calculus, gastric or duodenal ulcer or appendicitis. These patients may give a history of recurring tonsillitis during adolescence and no attack for ten or fifteen years.

The presence of painless, indurated and enlarged cervical lymphatics is suggestive that the tonsils have been previously diseased and are infected, although frequently enlarged lymphatics cannot be

discovered, either because they are absent or because they are not palpable. In about one-half of the cases, lymphocytosis and a decrease in the polymorphonuclear cells, with or without leucopenia, is present and is important diagnostically, but a normal leucocytic picture does not exclude infected tonsils. It is probable that infected tonsils at times are absolutely local and completely cut off from communication with the circulation, and therefore no change in the leucocytes could be expected, but these same tonsils may at intervals cause constitutional infection, because of intercurrent infections or diseases, such as influenza, typhoid fever, pneumonia, diabetes, cardiac or renal decompensation, or any condition that reduces the defense system of the body, such as malnutrition. Perhaps the commonest of all causes is an intercurrent infection.

When a vital organ is involved, such as the heart or kidneys, and reasonable clinical evidence exists that it is infective in origin, more especially if the polymorphonuclear cells are decreased, with lymphocytosis and leucopenia, and no other focus of infection is discoverable, the tonsils may be removed *on suspicion*, and a pathological and bacteriological examination of the excised tonsils will establish the correctness or incorrectness of the procedure. The pathogenicity of the micro-organism may be determined by its effect upon animals, and an autogenous vaccine is of value therapeutically, especially in the weak, emaciated, anemic and those advanced in years.

In those cases where an etiological diagnosis is all-important, and where evidence is insufficient, some diagnostic value may be given to a history of recurring attacks of tonsillitis, even though no attack has occurred for several years.

The tonsils may be considerably or moderately hypertrophied, normal in size, or small and buried, and frequently the anterior and posterior pillars are adherent to the tonsil. The anterior surface of the anterior pillars frequently presents a dark red and congested appearance. When these tonsils are subjected to pressure, some may yield no secretions, others show cheesy material or a thin milk-like fluid which, when cultured, usually shows the streptococcus hemolyticus or viridans. The crypts are frequently dilated and, after having been emptied, materials secured from the bottom of the crypt, by a platinum loop, when cultured, show the streptococcus hemolyticus or viridans, and a

similar organism may be obtained from the surfaces of the tonsils, and the bottom of the spaces between the tonsils and the anterior and posterior pillars. A negative culture when the tonsil is infected may be due to closure of the crypts by adhesive inflammation or to a circumscribed intra- or retro-tonsillar abscess. The small, buried fibrotic tonsil may give no obvious sign of infection, and the diagnosis of its infectivity may rest entirely upon the exclusion of all other foci of infection, together with the clinical and leucocytic manifestations of systemic infection. When these tonsils are removed, dissected and cultured, a streptococcus is usually obtained. Occasionally the tonsil is diseased and the patient gives no history of ever having had an acute tonsillitis. We do not possess complete information as to the way in which the tonsils primarily become infected, but we do know that they may become infected secondarily from pyorrhea around the lower molars, especially the last molar, and from sinusitis, especially from the ethmoid and sphenoid. It is probable that in a very large number of cases the primary infection occurred in childhood or adolescence and was due to infected milk, cream or cheese, or from general infections such as scarlet fever, influenza, etc. The infected tonsils may produce generalized ill health, with transitory attacks of arthritis or neuritis over a period of twenty or more years. In such cases, the tonsillar infection is usually local or latent and only occasionally systemic.

More than forty years ago, only the projecting mass of hypertrophied tonsils were removed by a guillotine-like instrument; later the tonsil was removed more completely by means of a snare; and today the tonsil is usually completely removed, but operators still leave remnants of tonsil. Any remnant of a diseased tonsil may become a concealed focus of infection, the cicatricial tissue formed after the operation completely closing the crypts and follicles, thus imprisoning infective material. It is not necessary that the remnant should be large; a remnant of diseased tonsillar tissue not larger than a pea may produce systemic manifestations of infection.

Occasionally, infected adenoid tissue separate from the tonsil, located in the region of the plica triangularis, or a thin bed of diseased tonsil left after a tonsillectomy may cause systemic disease such as Bell's palsy or chronic parenchymatous nephritis. Here again, the laryngologist, like the

dental surgeon, sometimes fails to appreciate the danger to the patient because of the *small* amount of diseased tissue present. The virulency, pathogenicity and specificity of the micro-organism and not the size of the diseased tissue, is all-important. Enlarged lingual tonsils and glands upon the posterior wall of the pharynx may become foci of infection and when cultured have shown the streptococcus hemolyticus. When infected tonsils and teeth coexist, better results follow a tonsillectomy if the teeth are first removed.

In chronic myocarditis or chronic nephritis, with decompensation, where the prognosis is serious, it is obviously more important to remove foci of infection *on suspicion*, than in a patient where there is only slight involvement of one or two small joints. In the first instance the patient cannot be permitted to assume the risk of allowing a tonsil or tooth suspected of infection to remain even though the evidence of its infectivity be insufficient to make a positive diagnosis; whereas, in the second instance, a tonsil or a tooth may be held under observation.

When all foci of infection are removed, the symptoms as a rule slowly ameliorate and disappear. Occasionally severe sacroiliac pain on motion, lasting for a year, pain in peripheral nerves of long duration, or cardiac arrhythmia of several months' duration, may disappear in twenty-four or forty-eight hours.

When all foci of infection have been removed the diagnostic leucocytic picture of lymphocytosis, decrease in polymorphonuclear cells and leucopenia may, under favorable conditions, disappear within two months and, under unfavorable conditions, may require three or four months. When this leucocytic picture persists, or if it returns after a temporary absence, it is an evidence that all foci of infection have not been removed.

Anemia, which is frequently associated with focal infection, slowly improves when all foci of infection are removed, even when no drugs are employed.

Although the great majority of foci of infection are in the head cavities, it is important to search for evidences of infection, even though symptoms be absent, in the genito-urinary tract of both sexes, more especially the prostate and seminal vesicles, the gastro-intestinal tract, the gall bladder, appendix, bones and joints.

The recognition of the association of focal infection with syphilis, diabetes and alcoholism is important therapeutically.

One year ago a statistical study* was made of 165 cases of chronic focal infection in adults and the conclusions were as follows: Small cell lymphocytosis with a corresponding decrease in polymorphonuclear cells is an important diagnostic sign of focal infection, the value of which is increased when leucopenia exists.

Lymphocytosis indicates that toxins or bacteria or both are entering the blood.

Lymphocytosis occurred only twice in 100 cases of chronic disease where no focal infection could be discovered.

The experience of the past year has confirmed these conclusions.

The combination of lymphocytosis, decrease in polymorphonuclear cells and leucopenia may be considered as a diagnostic leucocytic picture present in about one-half of the cases of focal infection. This diagnostic leucocytic picture in doubtful cases stimulates search for the undiscovered focus of infection, encourages prompt and radical surgical treatment, thus preventing more serious complications, warns us when all foci of infection have not been removed and is often the only way to determine latent infection or when a local focus of infection is systemic.

The object of this paper is to call attention to frequency of failure to diagnose:

1. Infected teeth;
2. Remnants of infected tonsils;
3. Infected adenoid tissue in the plica triangularis;
4. Infected lingual tonsils;
5. Infected pharyngeal glands;
6. Infected ethmoid or sphenoid sinuses;
7. Infected prostate or seminal vesicles;

Failure to diagnose focal infection occasionally occurs even though the examination is made by specialists in rhino-laryngology, urology, dentistry and roentgenology.

I also desire to *emphasize* the value of lymphocytosis, decreased polymorphonuclear cells and leucopenia in the diagnosis and management of focal infection.

THE COINCIDENCE OF SHINGLES AND CHICKEN-POX*

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At first thought it would appear that the relationship existing between herpes zoster and varicella, supposedly distinct diseases, was coincidence, their interesting concurrence from time to time being simply accidental. The diagnostician of the New York City Health Department, New York City, states that he has seen over 3,000 cases of chicken-pox but has never seen any case of herpes associated with it (Dana). This relationship in my mind was purely of an academic nature until after reading Dr. James Taylor's *Neurological Jottings*, and shortly after, having a case of herpes zoster facialis in my family, which two weeks later was followed by an attack of varicella in a grandchild.

A reference to the literature, which is chiefly European, showed that these coincidences occurred too frequently to be simply interesting or coincidental. Surely, as Ker states, they are puzzling, yet are we any nearer accepting the contention of Bokay² (Budapest) twenty-nine years ago that these diseases possess a common virus and are intercommunicable? Herpes zoster is no modern disease; it is hoary with antiquity; it is the zona of the Greeks and the cingula of the Romans.

As to the etiology of idiopathic herpes, we are still in doubt; yet it is generally believed to arise from a specific cause. Richard Bright, according to Gowers and James Taylor, was the first to suggest that herpes zoster was of nervous origin. While Von Bärensprung³ in 1863 pointed out that it was a disease of the sensory ganglia of the posterior roots, it remained for Head and Campbell⁴ to place its pathology on a firm basis. They demonstrated pathologically the presence of organisms in the nerve radicles involved and asserted that herpes zoster was an acute specific disease. Because of its similarity to acute poliomyelitis, they gave it the unfortunate name of posterior myelitis; Ramsey Hunt's researches⁵ showing that the peripheral ganglia of the 7th, 8th, 9th and 10th cranial nerves are subject to the inflammation of herpes zoster, add greatly to the belief that it is an acute infectious disease, caused by a specific agent

*Leucocytosis as a diagnostic sign of chronic periapical infection in adults. Jour. A. M. A., Oct. 28, 1921.

*Presented at the American Neurological Association, Washington, D. C., May 4, 1922.

(Sharpe⁶). Rosenow and Oftedal⁷ have isolated streptococci from tonsils, pyorrheal abscesses, sputum and spinal fluid from a case suffering from herpes and produced herpes with corresponding ganglionic lesions by animal inoculation with the strains of the organisms. Histological examination in Nyary's case showed an infarct due to thrombosis of a small artery in the ganglion on the third cervical root; this would tend to confirm the ganglionic origin of herpes zoster.

Hunt has demonstrated that the inflammation may extend to the adjacent ganglia both above and below although the eruption is confined to the skin area supplied by the ganglion originally affected. This, says Sharpe, explains those cases in which the eruption is in the zone of one ganglion and there are complications which can be attributed only to the involvement of other ganglia. The simultaneous involvement of the sensory ganglia of the cranial nerves is not uncommon and the great variety of resultant clinical symptoms are thus easily explained. Recurrent attacks of herpes zoster are rare. Head and Campbell⁸ reported four such cases out of more than four hundred patients. James Taylor⁹ has seen three cases, one of his patients having had four distinct attacks. Mrs. Riggs suffered from an attack of right thoracic herpes in her fourteenth year, this being her first attack. The literature would seem to indicate that herpes may assume a mildly epidemic form. Eliott¹⁰ reports four cases in a population of a thousand. A Parisian, says Jolly¹¹, suffering from herpes zoster, went to a village in Provence; within six weeks there were seven cases; there were no cases before his arrival. Kaposi records an epidemic of forty cases lasting from November, 1888, to February, 1899. Epidemics have also been observed by Cressy and E. J. Bruce.

An epidemic of herpes has been observed to occur side by side with one of varicella. The months in which it is most likely to occur, according to Wise¹², are September, February and March. Does herpes possess infectivity? Hall's case¹³ certainly would suggest this. X suffered from herpes zoster of the right upper fifth nerve. January 19, 1921, he spent the night at his sister's house; she was convalescing from a herpes of the trunk. The first symptoms developed on the 22nd, the eruption occurring on the 25th. Bocmeister has observed two cases developing (one within three days) after contact with a thoracic zoster (Bassoe). Gibbons

believes that herpes zoster can remain infectious for at least seven days from the date of eruption.

Taylor's neurological note interested me greatly and when a few months later this singular coincidence occurred in my own family, I thought it worth reporting. Last November (1920), Mrs. Riggs developed herpes zoster of the left face, affecting chiefly the second and third branch of the fifth nerve. There were a few scattered spots in the ophthalmic area, a few vesicles were observed in the external ear (the drum escaping), the mucous membrane of the mouth supplied by the superior maxillary and the inferior maxillary branches, also the left half of the tongue, was covered with the herpetic eruption, which caused great suffering; the teeth were exquisitely painful and after recovery several cavities were found which were not present before the illness. Over the area of the left chin the vesicles were practically confluent and, where the skin approached the mucous membrane of the lip, formed a scab. Distressingly painful as cephalic herpes is, there were no complications and recovery was uneventful aside from an aggravating paresthesia over the affected area, which still persists. About two weeks after the inception of Mrs. Riggs' illness, a grandchild developed a typical case of chicken-pox; the interesting fact is that there was no chicken-pox around and she had not been anywhere where she could possibly have contracted it. After the usual incubation period, her brother, in turn, developed the disease.

Some months since, I wrote a letter of inquiry to representative American internists, pediatricists and neurologists. None had ever seen such an association or had a similar experience. Dr. Frank Billings says, "My own clinical experience and for years in a large family practice has not afforded me a similar experience; in spite of the observations made by Dr. Taylor and by you it does not strike me as a probable truth of any such relationship between herpes and chicken-pox." Dr. Alfred F. Hess (New York) says, "There seems to be some connection between the two disorders, but evidently it is not close from a clinical standpoint." Such observers, on the other hand, as LeFeuvre¹⁴, Cranston Low¹⁵, McDougall and Hartill¹⁶ are of the opinion that the virus of herpes and varicella is one and the same thing. Low advances the ingenious theory that the herpetic infection spreads from the nose along the lymphatics to the olfactory nerves and the cerebrospinal fluid, thus affecting

the spinal ganglia, whereas in varicella it is probably a blood infection. Why at one time it should enter the blood stream giving rise to a skin affection—chicken-pox—and at another it should reach the nervous system through the nose along the lymphatics to the olfactory nerves awaits explanation. In the combined cases it is assumed that the infective agent reaches the spinal ganglia first and a few days later invades the general circulation. "Shingles," says LeFevre, "should be definitely recognized not only as an infectious disease, but also one liable under certain unknown conditions to become a starting point for a chicken-pox epidemic."

For convenience in discussion, this subject may be grouped under three heads:

A. Herpes zoster followed by chicken-pox within the usually accepted period of incubation of twenty-one days;

B. Chicken-pox followed by herpes;

C. Generalized herpes and herpes and chicken-pox existing in the same individual at the same time.

A. According to Kerin, 1920, there were fifty-six cases in this group. Last February, Carver¹⁷ reported the analysis of fifty cases in which the interval between the appearance of the herpetic eruption in the one patient and that of the varicella in the other, varied from eight to twenty-one days. In the literature since, I have been able to find fourteen additional cases; there are doubtless other cases I have overlooked. In Group A (my case and as for that most of the cases fall into this group), there are eight adults; among Carver's cases varicella among adults is rare. From 1870 to 1892 there was admitted into the Municipal Hospital of the City of Philadelphia, thirty-five cases of adult varicella (S. Chamberg). Fagge¹⁸ says that it seldom occurs in children over ten years old. Some writers state that they have never seen a case, but that it exists I can personally testify as I had a very severe attack after I was twenty-five years old. Von Gerner¹⁹ has analyzed 29,250 cases of chicken-pox and finds 98.22 per cent occurred before the fifteenth year. The usual thing is for the adult to have the shingles and the child the chicken-pox. When herpes zoster is followed by chicken-pox in the same person, the latter may give rise to either disease (Kraus).

B. Chicken-pox, followed by herpes in another individual, is of rare occurrence. I have collated

thirteen cases. LeFevre has reported four cases (Ker); Heard²⁰ one—a grandfather living in the same house with a grandchild developed herpes over the second costal cartilage on the left side—twenty-two days after chicken-pox had appeared in the child. Dando's cases, although interesting, may be regarded as coincidences. The boy of Aikman on whose body the remnants of a varicella rash still were present, returned to school. Seven days later his teacher, a young woman of thirty-two years of age who had never had varicella, developed a right thoracic herpes zoster. In Guy's Hospital Gazette, May 24, 1913, it is stated that a boy aged thirteen years contracted a herpes zoster two and one-half weeks after exposure to varicella infection. According to Taylor, a Dr. Brown, who had been attending a case of shingles, contracted an attack of thoracic herpes; his daughter two weeks later came down with a mild case of chicken-pox. It is important to note that Brown's patient had been exposed to a varicella infection. Evans²¹ reports a case of a child that manifested herpes a week after her sister had developed chicken-pox. During their convalescence the third child came down with varicella. He regarded herpes in the second child as a link between the two cases of chicken-pox. Feer²² reports a case of herpes in a boy of nine who had been exposed to chicken-pox two weeks previously. Seventeen and twenty days later chicken-pox developed in two children who had been in contact with the herpes zoster. Gara²³ also reports two cases of chicken-pox in a family of three children which was followed two weeks afterwards by herpes zoster in the third. Abrahamson (Dublin) observed typical attacks of herpes zoster in the mother of a little girl and her maid a week after the child had recovered from chicken-pox. Heatherly's case also falls under this group. Elliott²⁴ reports a series of cases of herpes-varicella association which he thinks proves that not only may varicella be contracted from herpes but that the converse is also true.

The number of cases in this group, according to Ker, is so small that the theory of coincidence so far as they are concerned presents no special difficulty. The fact is, however, that one accurately reported case definitely settles the classification. McEwen states the matter fairly when he says, "If zoster can lead to varicella, why should not varicella lead to zoster?"

C. The term, "generalized herpes," is used very

carelessly in literature, being hopelessly confused with the concurrent form. Since with our present knowledge we are unable to distinguish between these two conditions, necessity compels us for the present, at least, to classify them in the same group. McEwen says that he has been able to find twenty-five reported cases of the generalized type. Dr. Taylor states that he has seen in a woman of eighty a herpes of three distributions, the eruption in these three cases occurring at the same time in the three areas. The surprising thing is that since herpes is an acute infection there is not a more general involvement of the posterior root ganglia producing multiple areas of zoster lesions. The tendency to involve the adjacent ganglia in the cephalic extremity is well known and it is in this way we explain those cases of herpes zoster, *sine herpete*, i.e., an absence of eruption with the presence of pain and possibly paretic nervous disturbance. The case of C, reported by Schamberg²⁵, is an excellent example of the generalized type; he has observed two cases, both elderly men. November 25, 1909, C began to suffer pain in the left scapular region; on the 28th there occurred an extensive eruption covering the left scapular region, the left pectoral region and the inside of the left arm. On November 29th, a scattered eruption was observed on various parts of the body. There were about 500 lesions in all; most of the eruptive elements were papular but here and there distinct herpetic vesicles were observed containing clear and occasionally hemorrhagic fluid. Some lesions were characteristically umbilicated. The palmar surface of the left hand exhibited some papules and a number of abortive vesicles. The temperature was practically normal and the itching was slight.

The following case of Ker²⁶ is without doubt a generalized herpes. A man fifty-five years old was sent to the hospital as a small-pox suspect. There were fever, shivering, pain in the small of the back; a few dry vesicular lesions were observed on the scalp, one or two on the face, several on the trunk were filled and vesicular in appearance, while others were dry and crusted. There was a very suggestive oval crust on the right shoulder blade; only one vesicle was observed below the elbow; there were none on the legs; around the arm on the left side was a profuse eruption of typical herpes with some outlying vesicles which were identical in appearance with one or two noticed in the sacral region. A man²⁷, eighty years old, was

suddenly seized with a severe pain with definite tenderness along the course of the external popliteal nerve. Three days later small papules, evenly distributed, appeared over the trunk, shoulders, arms and back of both thighs; by the next day the rash had become vesicular; also new papules showed themselves in the same distribution with the addition of some over both legs. The appearance of the rash was indistinguishable from that of a chicken-pox of moderate severity. Five days later an intense herpetic eruption appeared on the left buttock and leg in two well-marked lines and over the sole of the left foot in a definite line. The entire leg was painful, while the acute pain at the original site had diminished. Six weeks later there were occasional shooting pains over the area of the distribution; this was also hyperalgesic. There was no previous history of herpes or chicken-pox. The patient had been previously taking two minims of Liquor Arsenicalis three times daily. The assertion that in herpes no eruption occurs on the palms of the hands or the soles of the feet is shown by the last two cases to be incorrect.

The "aberrant vesicles" of Tenneson²⁸ resemble the zoster group. They occur irregularly, widely separated from each other, are present in nine out of ten cases and are distributed over the entire body. Extensive zoster always and moderate zoster usually develop these vesicles (Molinie²⁹). Fasal³⁰ suggests that the term "aberrant vesicles" be limited to lesions in the neighborhood of the zoster and that herpes zoster with generalized eruption be applied to the more extensive distribution, indicating that the second rash is not necessarily a zoster.

The following cases are good examples of the concurrent form, i.e., the appearance of herpes zoster and chicken-pox in the same individual. LeFeuvre has reported four cases. He thinks this type indicates that we have to deal with one disease for which he suggests the name "varicella herpetica." The earliest record of the double eruption, according to him, was made by Pundsehn in the Wiener Medizinische Presse of 1865. He emphasizes two points: (1) when both eruptions appear in the same individual the herpetic invariably precedes the varicellar; (2) there is a constant interval of two to five days between the eruptions. This, however, can only be regarded as an approximate estimate of the time of the rash's appearance. The dogmatic assertion that the herpetic eruption invariably precedes that of varicella is discredited

by Lampe's case where the herpes zoster developed during an attack of chicken-pox. There was also an associated paralysis of the muscles of the abdominal wall and the diaphragm. Fairbanks³¹ (New York) reports a little sister five years of age as developing an attack of herpes zoster between the sixth and ninth thoracic segments about two weeks after she contracted chicken-pox. Low cites the case of a woman of 40, in whom herpes zoster was followed in two weeks by chicken-pox.

Goldberg and Francis³² report the history of three patients who had herpes zoster with a simultaneous chicken-pox. Hill³³ reports a case of herpes of the ophthalmic branch of the right fifth nerve, which within six days developed a general varicellar eruption on the trunk, upper and lower limbs. Elkington's³⁴ patient suffered from a herpes of the 5th and 6th right dorsal root areas; three days later two dozen macular papules and vesicles appeared on the trunk, shoulder and buttocks; six days afterward 100 vesicles could be counted, the face having become involved. Hall's³⁵ patient manifested a herpes of the left anterior crural nerve; several days later there occurred a typical varicellar rash on scalp, trunk and limbs. Ker's patient, a girl, developed a typical herpes patch over the left shoulder-blade; the next day a few characteristic varicellar patches appeared in the neighborhood; there were several on the right side of the back; she was sent to a chicken-pox ward but did not develop the disease. One of the children, however, who had been exposed by her, did so. In McEwen's³⁶ case a man manifested a zoster involving the left first and second branches of the fifth nerve; a typical varicellar eruption occurred five days later; ten days afterward a child, who had been exposed, came down with chicken-pox. Webber's³⁷ patient suffered from leukemia. Two weeks after the administration of arsenic there occurred a typical zoster of the right shoulder; five days later there was a scant and generalized eruption of varicellar-like spots. Ten days after the appearance of the herpes, a four-year-old boy in the same ward came down with chicken-pox. Webber believed that the zoster and rash was caused by the arsenic, but the occurrence of varicella in the boy absolutely eliminated the possibility of a secondary zoster. Corlett³⁸ reports four cases of herpes zoster accompanied by a varicellar rash. He regarded these cases as unique because of the association of these two eruptions.

Head³⁹ records a case of herpes zoster in a boy, corresponding to the fifth dorsal nerve, which was followed in twenty-four hours by an eruption of chicken-pox. Some ten years ago Ormsby observed a case of herpes zoster of the face and scalp, which four days later developed a generalized varicellar-like eruption.

There are twenty-two cases of the concurrent type. In those of Fairbanks and Low, the interval is longer, not within a week as in the other cases of the concurrent affection. "This," says Ker, "is difficult to explain either on the theory of a generalized herpes or an initial herpetic distribution."

The simultaneous attacks of herpes and chicken-pox in different individuals have been reported by Law, Oakes and Gray⁴⁰. The cases have been few, the probability of coincidence, according to Ker, great. Two of the cases to which I have referred had taken arsenic prior to the appearance of the herpes with its associated generalized varicellar rash. In Webber's case, as already stated, the eruption was undoubtedly that of a true varicella. His second case, as well as that of McNaughton, had, in like manner, received arsenic prior to the development of the combined herpes-varicellar manifestations. There is no note of any subsequent varicella eruption in other persons. That carbon monoxide, arsenic or other chemical poisons can cause disease of the sensory ganglia there can be no doubt. The same is equally true of focal infective processes, and the acute infections. The prevalence of herpes zoster during epidemics of acute poliomyelitis and epidemics of cerebro-spinal meningitis has been observed, as has also its occurrence in tuberculous meningitis and lethargic encephalitis. Lingenfelter has noted its presence in small-pox; tumor of the cord, disease of the spine, pneumonia are also causes. There are many expressions of secondary herpes absolutely separate and distinct from that acute and definite infection that a consensus of opinion has designated herpes zoster. When considering the relation between herpes and varicella, one must bear in mind Cantor's⁴¹ interesting statement that on Christmas Island, Straits Settlements, for a period of twenty years or more, the statistics of disease show that while herpes zoster has been comparatively common, varicella has been unknown. The population is mixed, i.e., Europeans, Indians, Malays and Chinese, and has varied between 500 and 1,500. On

the mainland varicella has occurred with ordinary frequency; he assumes that the micro-organism of chicken-pox differs at least in degree from that of herpes zoster. The absence of varicella on Christmas Island is an interesting observation, yet this paper makes perfectly clear three things—that in more than sixty cases varicella has occurred within twenty-one days after contact with herpes zoster; that in thirteen patients herpes zoster has developed in cases after exposure to chicken-pox and finally that the concurrence of these two diseases is a matter of repeated observation. There is one point of similarity between these two diseases, i.e., the rarity of their recurrence. In one of Dr. James Taylor's patients there were four distinct attacks. Osler has observed three attacks of chicken-pox in the same case; Schamberg has also seen it recur, while such experienced observers as Drs. Morse and Talbot of Boston and Drs. Holt and Hess of New York have never seen it recur the second time. I had hoped to find from the investigations of the spinal fluid in these diseases some data that might throw light on this interesting coincidence, but unfortunately no work along this line has been done. Dr. Schaller⁴² (San Francisco) has examined eleven non-luetic cases; there were no attempts at culture or examinations for bacteria. In five of these eleven cases, there was a cellular increase; the globulin was negative or but slightly increased.

The contention of Low, LeFeuvre and others that the virus of herpes zoster and varicella is one and the same remains to be proved, but that a close connection, as Taylor phrases it, does exist is beyond the question of a doubt. The solution of this, like most of the problems of medicine, rests with the general practitioner. The utter barrenness of American literature with reference to this subject is startling. Of all these preceding references only six are American. If they have occurred they have certainly not been recorded. A brief history of such a case should be reported to a representative medical journal so that from an accumulation of many repeated observations the question of relationship or coincidence may be definitely settled. One fact I would emphasize—that while herpes in young children is without pain or at the most there is only a little numbness or tingling, in advanced age an excruciating neuralgia may persist until death, and the possibility of chicken-pox in a child being followed by herpes in an exposed elderly person must not be overlooked.

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HYPERHIDROSIS OF THE CHEEK ASSOCIATED WITH INJURY TO THE PAROTID REGION

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Three patients have been examined in the Mayo Clinic who have had a hypersecretion of sweat over the cheek during the taking of foods or other stimulation of the salivary secretion. Each patient gave a history of having previously been injured in the parotid region.

Hyperhidrosis is a condition of excessive secretion of the sudoriparous glands. Generally, the secretion does not in any way differ from normal sweat, except in certain cases in which it is fetid, acid, or alkaline. It may be general, as when it occurs as a concomitant of certain diseases, such as tuberculosis, rheumatism, or Graves' disease. More commonly the condition is local, being confined to a part of the body, as the hands, feet, or face. Hyperhidrosis may be of any degree of severity, ranging from a slight increase of such secretion to such an excess that it pours in streams from the body. It may be constant, but, as a rule, the attacks are paroxysmal, and the condition is excited and increased by some external stimulus.

Localized hyperhidrosis, not uncommon in several of its forms, often presents a very interesting appearance, especially when it is confined to the face or neck, and is reflexly influenced by various stimuli.

REPORT OF CASES

Case 1 (A365267). Mrs. R. C. H., aged twenty-five years, came to the Clinic July 18, 1921, because of chronic purulent discharge into the mouth and marked sweating over the left side of the face, both brought on by eating any sapid food. Three years before, during an attack of influenza, an acute swelling, which had developed over the left parotid region, was lanced and an abscess drained for six weeks. The patient had experienced no further trouble until one year later, when she noticed pus draining into her mouth; this had persisted in various degrees. The sweating, which was noticed after the first attack of acute parotitis, had always

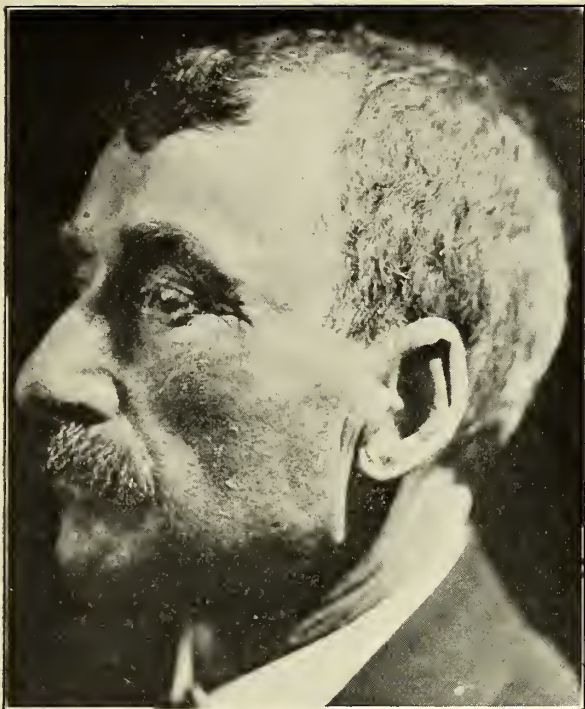


Fig. 1 (Case A354164).—Area of sweating over the left cheek following the taking of food.

been confined to the left side of the face and was brought on by eating. At other times she was not bothered by her affection. Since the attack of parotitis, she had often noticed fine twitchings of the muscles of the left side of the face.

Examination revealed a linear scar just posterior to the angle of the left lower jaw. There was no induration of the parotid gland, but pus could be expressed into the mouth from Stenson's duct on the left. A few minutes after eating acid fruit there was marked sweating on the left side of the face, extending from the hair line to the lower jaw, and anteriorly from the auricle nearly to the angle of the mouth.

Case 2 (A354164). Mr. M. T., aged fifty-one years, came to the Clinic April 4, 1921, because of profuse sweating on the left side of the face, brought on by taking food into the mouth, mastication not being necessary. Sweating had been present since thirty years before, when a blow he had received over the left temporal and parietal regions had stripped the scalp and left auricle down over the face. The area of sweating was bounded by the left ear, the nose, the hair line over the temporal region and the lower edge of the mandible. The secretion was so marked that many drops of sweat would cover the affected area,

which often felt numb and occasionally ached. No twitchings were noted.

The patient was a healthy-appearing man. Examination revealed aortitis of long standing. The blood Wassermann reaction was strongly positive; there were no other signs of syphilis. There was a long curved lineal scar extending from a point 12.5 cm. above the left ear to a point just below and 7.5 cm. behind the ear. The auditory canal was completely closed by scar tissue. The left brow could not be wrinkled as much as the right, nor could the left eye be closed as tightly, although there seemed to be no fixation of the soft part to the underlying bone. There evidently had been partial paralysis of the superior branches of the facial nerve. The patient was given a pickle to eat and in a few minutes a profuse secretion of sweat appeared over the left side of the face (Fig. 1).

Case 3 (A388119). A. H., a girl, aged six years, came to the Clinic April 4, 1922, because of a sinus below the left ear and profuse sweating on the left side of the face during eating. When five days old, she developed acute parotitis on the left side. The swelling had been lanced just below and back of the left ear, and a sinus had persisted ever since, with discharge of a clear, watery secretion, especially during mastication. Immediately after the lancing of the abscess, the left side of the face had become paralyzed, but had long since recovered sensation. Since lancing there had been marked flushing and hyperhidrosis of the left parietal region whenever the patient had taken food. This was especially marked when the food had an acid taste, such as pickles, sour fruit, and often it was necessary to cover the patient's shoulder with a towel to protect her clothes. The child had become very sensitive about her condition and would seldom eat if strangers were present.

General examination was negative, except for a small fistula of the parotid on the left side of the face opening just below the auricle. Stenson's duct was patent. There was faulty regeneration of the left facial nerve, as shown by the fact that, on closing the left eye, the left corner of the mouth twitched. When the child ate a pickle, marked flushing, followed by profuse sweating, covered the left parotid region (Fig. 2).

The fistula of the parotid was cauterized. On examination two months later the fistula was entirely closed, but hyperhidrosis remained the same.

PHYSIOLOGY OF SWEATING

The secretory activity of the sweat glands has been shown to be regulated by definite secretory nerve fibers which form nerve trunks in close relation to the vasomotor fibers. Dupuy, in 1816, showed that division of the cervical sympathetics in a horse produced a marked and persistent secretion of sweat in the half of the head operated on. This was accompanied by a neuromyolytic hyperemia. This experiment was confirmed by others later. Campbell, Jamieson and others have observed cases of unilateral sweating of the face, accompanied by headaches and flushing. The correlation of the phenomena of sweating and flushing is, however, not constant or necessary. Often sweating is observed in areas of marked pallor, denoting vasoconstriction. Langley has shown that all the fibers capable of evoking sweating left the spinal cord by way of the anterior roots and between the second thoracic and third lumbar segments. These fibers are distributed to the cutaneous surface by the nerves of general sensibility.

Sweat centers which control sweat secretion have been localized in the lumbar and cervical cord and medulla by various investigators, though some have not recognized the existence of such centers. Certain authors admit the existence of fibers antagonistic to the sweat gland. The existence of these fibers has never been definitely proved, but in many cases, the clinical facts could best be explained by assuming the existence of two sets of fibers controlling the secretion of sweat.

THE ETIOLOGY AND PATHOLOGY OF HYPERHIDROSIS

General hyperhidrosis is, as a rule, associated with general debility, and probably in many cases is symptomatic of some grave underlying, unrecognized disease. It is commonly observed in Graves' disease, tuberculosis, and malaria, and in various diseases of the nervous system, such as erythromelalgia, tabes dorsalis, spinal gliosis, and general paralysis of the insane. It has also been observed as a phenomenon of psychic degeneration, and is occasionally seen in neurasthenics. Anything that impairs the general body health and depresses the tone of the nervous system is apt to result in hyperhidrosis.

The literature on localized hyperhidrosis during the last twenty years is quite meager. Previous to that time several interesting and instructive papers had been published. Localized hyperhidrosis

has been ascribed to many and various causes. As the condition has been confined to the face only in the cases observed at the Clinic, we will confine ourselves to the various views of the etiology in these cases. Raymond has classified the etiologic factors of hyperhidrosis in four groups as: (1) a result of disease of the central nervous system; (2) a result of disease of the cervical sympathetics; (3) a result of disease of the fifth and seventh nerves; and (4) reflex in origin from irritation of other nerves, such as those of taste, smell, and touch.

Group 1. Hyperhidrosis due to disease of the central nervous system. Raymond and others have reported several cases of hyperhidrosis of the face due to various lesions of the central nervous system, the exact diagnosis of which, however, was not made clear. Head has observed several such cases in patients with spinal cord injuries. Sweating seems to be reflexly stimulated by processes below the site of injury, such as distention of the bladder, changes of gas pressure in the bowels, or certain stimuli applied to the limbs. Hyperhidrosis in these cases occurred in various portions of the body. If the etiologic factor causing hyperhidrosis is of peripheral origin, sweating after the administration of pilocarpin occurs from two to three minutes earlier in the area affected by localized hyperhidrosis than in other parts of the body. If, however, hyperhidrosis is due to changes in the central nervous system, sweating appears in all parts of the body at the same time. This method has been used in attempting to determine whether certain neurologic findings associated with localized hyperhidrosis were due to lesions of the central or peripheral nervous systems.

Group 2. Hyperhidrosis due to disease of the cervical sympathetics. A very interesting syndrome is that in which hyperhidrosis is confined to one entire side of the head and neck and accompanied by signs of sympathetic paralysis of the same side. Hyperhidrosis in these cases is usually associated with blushing, myosis of the pupil, narrowing of the palpebral fissure, and occasional unilateral headache—all of the side affected. Occasionally, there is tenderness over the cervical sympathetic ganglion of the same side. These findings all speak for a lesion causing partial paralysis of the cervical sympathetics. Raymond reports such cases and quotes Fränkel, Nitzelnadel, Ogles, Verneuil and others who had observed the same syndrome.

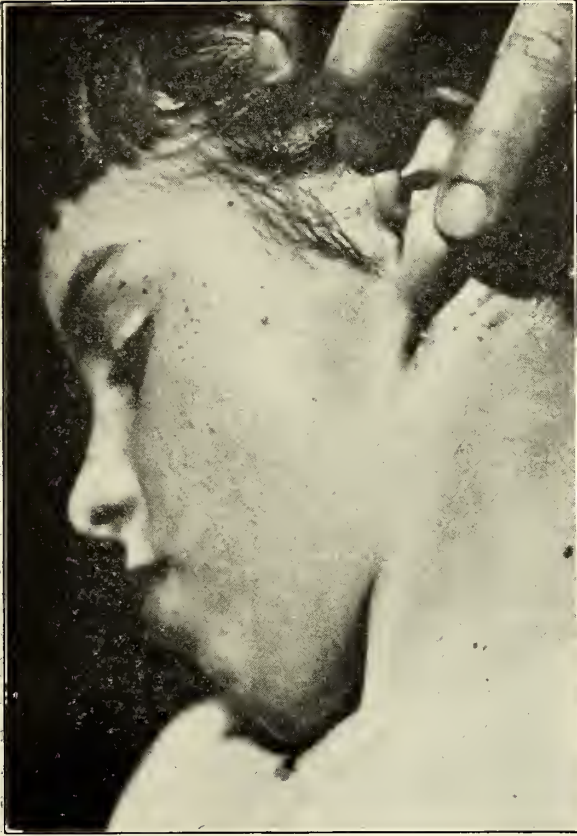


Fig. 2 (Case A388119)—Area of sweating following the taking of food. Also the scar just below the left ear.

Riehl, in 1884, reported a similar syndrome, except that the patient had mydriasis instead of myosis, thus showing that hyperhidrosis may be due to irritative lesions. As a rule there has been some pathologic condition in the neck or chest to account for the sympathetic disturbance. Aneurysm, enlarged thyroid, bullet wounds, trauma due to surgery, and abscesses of the cervical region have been found in these cases. On the other hand, in some cases no demonstrable lesion was found.

Group 3. Hyperhidrosis, due to disease of the fifth and seventh nerves. Injury to the peripheral nerves, especially those of the fifth and seventh, seems to be the most common cause for hyperhidrosis localized to the face. Weir Mitchell was among the first to draw attention to the fact that localized hyperhidrosis may follow injury to the peripheral nerves. As some of his patients had hyperhidrosis and others anhidrosis, he was at a loss to account for the exact mechanism causing these phenomena, and considered it "a matter which appeared to follow no rules." Church has

called attention to the fact that hyperhidrosis is occasionally seen in cases of polyneuritis, especially in those due to arsenic. Remak has made some very interesting observations on localized hyperhidrosis in cases of neuritis. He says the phenomenon is not at all uncommon, as he has observed it several times in patients with neuritis due to carbon bisulphide poisoning. Babinski has made the same observations. Erlenmyer, on the other hand, reported a case of peripheral median neuritis in a patient with diphtheria; there was total inhibition of sweat secretion over the cutaneous surfaces supplied by the median nerve, although the patient was sweating on all other parts of the body.

Localized hyperhidrosis has also been observed in association with various neuralgias. Remak and Windscheid have reported several cases associated with supra-orbital neuralgia. Débrousse-Latour and Natha both reported cases of localized hyperhidrosis of the face, occurring simultaneously with attacks of tri-facial neuralgia. Landois has shown that sweating can be induced by irritation of the infra-orbital nerve. On the other hand, Schuh has observed that after section of the frontal nerve, excessive perspiration occurs at all times over the distribution of that nerve. Many of these patients had marked blushing over the affected area, as reported by Bouveret, Campbell, Windscheid, and others. Case 3 in the present series demonstrated this association very forcefully.

The facial nerve also carries fibers controlling sweat secretion. Adamkiewicz has shown that in healthy persons faradic stimulation of the facial nerve may produce sweat secretion. Straus and Bloch, in 1880, found that in cases of facial paralysis, secretion of sweat appeared on the face only as long as the nerve was electrically irritable. Nawrocki has observed in cases of facial paralysis that with gradually returning irritability of facial fibers electrification causes sweat to appear on the previously parchment-dry portion of the face. Shultz and Nitzelnadel report cases of partial facial paralysis with hyperhidrosis associated with muscle twitching of the affected side. These cases seem to show that hypersecretion is due to irritation of the secretory fibers in the facial nerve. In support of this view Rohrig observed that plastic flaps turned from the forehead do not sweat until sensation occurs, or, in other words, until the fifth nerve functions. On the other hand, Windscheid reports three cases of hyperhidrosis in patients

with facial paralysis; in two sweating varied directly with the severity of the paralysis, and the greatest degree of hyperhidrosis appeared when there was complete facial paralysis with degeneration of muscle and no irritability. In these cases, with apparently contradictory findings, the explanation appears to be possible only on assuming the existence of both secretory and inhibitory fibers of sweat glands.

So-called parotid ephidrosis is not uncommon. It is generally confined to the parotid region and accompanied by blushing. As a rule, some preceding trauma has evidently been the etiologic factor, commonly abscess or knife wound in the parotid. As Bouveret has pointed out, Stenson's duct is occasionally obstructed in these cases. The secretion was once thought to be a transudation of the parotid secretion, as it often appears at the time of eating. It is now known to be reflexly stimulated by the food, and it is real sweat and not parotid secretion. All three of the cases at the Clinic belong to this group. Parounagian, Bouveret, and others have described similar cases.

Group 4. Hyperhidrosis of reflex origin. Probably the most interesting group of cases is that in which localized sweating is reflexly evoked by the stimulation of sensory nerves. Quite often an emotional disturbance will bring on marked secretion. Usually it is the nerves of taste and smell which carry the sensory stimuli. Brown-Séquard reported six such cases, and was himself a very good example. Whenever he took any sapid food into the mouth, a marked secretion of sweat appeared over one side of the face. In some cases, mastication of food is necessary to bring on the secretion. Raymond and others have reported such cases. Bouveret observed a case, but the sweat stopped as soon as mastication occurred. In this country, Sequeira, Parounagian, Wende and Busch, and Church have reported similar cases. All three of our cases responded to such stimuli. There are many cases, however, in which a history of preceding injury cannot be discovered as an etiologic cause and in such cases the disturbance in the secretion of sweat may be due to reflex phenomena alone.

In several cases which have been reported, there has been a familial history; this brings up the question of heredity as an influence in cases of localized hyperhidrosis of reflex type. Ollivier reported a case in which the increased sweat secre-

tion was localized to the region supplied by the superior maxillary division of the fifth nerve. The patient had a sister who, with her three children, was similarly affected. Wende and Busch reported three cases, all of the reflex type, and all members of the family similarly affected. The first patient's mother and sister were affected with a similar type of hyperhidrosis. The second patient's paternal grandmother, father, and two sisters were also affected. The third patient's grandfather, father, brother, and son were all similarly affected. The authors brought out three points: (1) the condition was not congenital, as it had not appeared in any instance until puberty; (2) localization of sweating was identical in all members of the same family; and (3) only certain taste stimuli produced hyperhidrosis, and the same stimuli produced sweating in all members of the same family.

As may be expected from the great number of etiologic factors which appear to have a bearing in the production of localized hyperhidrosis and the fact that there are several contradictory opinions about the real mechanism, the pathology has been thoroughly studied in only a few instances. Robinson, who has examined a number of sections from the palm in cases of hypersecretion, has failed to detect any abnormality either in the size of glands or in the glandular epithelium. Sutton, in similar investigations, found only slight hypertrophy of the coiled glands. Frankie and Ebstein have both observed cases of unilateral hyperhidrosis with signs of sympathetic paralysis. At necropsy multiple varicosities of the vessels of the cervical sympathetic ganglia were found. The ganglion cells, however, were normal in size but heavily pigmented. They thought that the presence of these varicosities was a sufficient cause for chronic irritation of the ganglion cells. Raymond observed a patient with unilateral hyperhidrosis with changes in the sympathetic system. At necropsy tuberculosis of the lungs and pleura was demonstrated. The inferior cervical sympathetic ganglion of the affected side was enlarged, and microscopy revealed fibrous changes and increased vessel formation and cell proliferation. These were all signs of chronic inflammation which, no doubt, explained the cause of the hyperhidrosis and associated phenomena.

SUMMARY

Localized hyperhidrosis is due to disfunction of nerve fibers that control sweat secretion. The

causes may be divided into two groups. If the condition is reflex in origin, no history of disturbance of nerve function can be elicited. This group comprises patients who have sweating strictly localized, or covering one side of the neck and face, and evoked reflexly by the stimulation of the nerves of taste or smell. The second group is comprised of cases in which trauma or a lesion of the nervous system can be demonstrated. The site of the lesion may be either central or peripheral. If peripheral, the secretory fibers may have been affected either in the sympathetic ganglion or during their course in some of the nerve trunks. Whether the lesion is irritative or paralytic cannot be definitely determined, as patients whose clinical findings demonstrate either cause, have been reported. In view of so much apparent contradictory evidence, we do not feel warranted in drawing any conclusions as to the pathologic physiology that influences hyperhidrosis.

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BRONCHIECTASIS—A REPORT OF FIFTY-ONE CASES**

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This report represents a series of consecutive cases of bronchiectasis which we have studied during the last six months.* It was very interesting to note that the history of epidemic influenza was quite frequent and it appeared to us that influenza might bear a close relationship.

Osler, in the eight edition of *The Principles and Practice of Medicine*, published in 1916, makes the following statement: "The disease (bronchiectasis) seems to have increased in frequency since the influenza epidemics of the past fifteen years. Of six consecutive cases in my ward, in the session

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of 1904-05, from every one Boggs isolated the influenza bacillus."

Bronchiectasis is generally considered to be a rather uncommon condition, but we find it to be relatively frequent. Detection of early bronchiectasis is difficult and the condition is not frequently diagnosed early. It is common to look upon bronchiectasis as producing cavities only and for the patient to expectorate large quantities of sputum. However, the condition may manifest itself only by a slight diffuse dilatation of the bronchial tree of the lower lobes. This form is frequently overlooked both by the clinician and the roentgenologist. The x-ray picture of the advanced types is distinctly more characteristic.

Etiology.—Any long standing inflammatory process of the bronchi tends to weaken the walls. The muscle fibres and elastic fibres become atrophied and separated. The result is that severe coughing, kept up for a period of time, and raising the intra-bronchial pressure beyond the limits of resistance of the weakened and thinned walls, produces permanent dilatation.

The common conditions predisposing to bronchiectasis are:

1. Broncho-pneumonia, following influenza.
2. Chronic bronchitis, the result of a series of acute respiratory infections involving the bronchi as well as the upper portions of the tract. This is a common cause in our northwest climate, where there are sudden changes in weather conditions, with rapid fluctuations of temperature.
3. Chronic bronchitis or pneumonitis, following inhalation of irritant gases such as used in warfare.
4. Chronic pulmonary tuberculosis, with resultant fibrosis. The more disseminated and dense the fibrosis, the more favorable are the conditions for bronchiectasis.
5. Inhalation of dust, chiefly inorganic, causing inflammatory changes in the mucous membrane of the upper air passages and later in the mucosa of the bronchi, and leading to fibrosis. These conditions are found in stone masons, miners, potters, millers, etc.
6. Conditions causing narrowing of the lumen, such as tumors, enlarged glands, foreign bodies, aneurysms and gummas. Where secretion accumulates there will be inflammation of the bronchial wall and induration about the bronchi, leading to dilatation.

Morbid Anatomy.—Packard, in his recent article on non-tuberculosis changes in the lungs, states that all pneumonias take either of two courses: (1) absorption of the exudate and recovery; or (2) organization of the exudate going on to pulmonary fibroses, thickening and weakening of the bronchial tubes, bronchiectasis and emphysema. The first course is that followed by lobar pneumonia; the second is seen commonly in broncho-pneumonia, almost always a complication of influenza.

The changes resulting in bronchiectasis are commonly found in the lung bases and are often bilateral. There are three more common varieties: (1) infiltrative, as pointed out by Moore; (2) cylindrical or fusiform, common in tuberculosis; (3) saccular, with cyst-like cavities. In advanced cases with multiple bronchiectatic cavities the appearance of the x-ray plate may suggest soap-bubbles.

Symptoms.—The symptoms depend in general upon the extent and character of the pathological changes. They may be very slight or may simulate those of advanced pulmonary tuberculosis. Loss of weight may be slight or none at all.

Ash in his report on 551 necropsies from eight different hospitals on supposedly tuberculous cases found sixty-one non-tuberculous. McRae and Funks in a series of 1,200 hospital cases for advanced pulmonary tuberculosis found seventy-two that were non-tuberculous.

Three cases came to our attention who were in sanatoria from six to twelve months for advanced pulmonary tuberculosis, who on examination including x-ray studies and repeated sputum examinations, were found to have bronchiectasis, not complicated by tuberculosis.

The symptoms usually are not in proportion to the physical findings when contrasted with a disease like tuberculosis. The patient, as a rule, complains only of attacks of paroxysmal cough in the morning, with varying amounts of expectoration. Fever may be slight or absent. Physical examination, however, may show marked lung changes.

Expectoration.—Sputum examinations are very valuable. Any amount over 25 c.c. in twenty-four hours for any length of time, and not occurring during an acute infection, is valid ground for suspecting bronchiectasis. Fifty to 75 c.c. under the same conditions is strong evidence for bronchial dilatation. It is usually muco-purulent, and repeated examinations in the series studied did not show acid-fast organisms. The odor may be foul

or unobjectionable. Large amounts of sputum separate into three layers on standing: (1) lower, opaque and greyish containing most of the cellular elements; (2) middle, thin and turbid, containing considerable amounts of stringy mucus; and (3) top, frothy and brownish.

The advanced cases may complain of dyspnea, hemoptysis, severe chest pain due to pleural involvement, night sweats, loss of weight and fever. It is not uncommon for these patients to manifest the arthralgias, arthritides, myalgias and myositides, that one sees in other forms of focal infection.

Our series of fifty-one cases gave the following symptoms and signs or history in order of their frequency:

<i>Symptom or Sign or History</i>	<i>Number</i>	<i>Per Cent</i>
Cough	51	100
Expectoration	51	100
Pains in chest.....	39	77
History of Influenza.....	36	72
History of Pneumonia.....	6	12
History of Pleurisy.....	12	23
"Catch Cold" easily.....	21	41
Temperature	18	35
Loss of weight.....	17	33
Night sweats	7	14
Hemoptysis	2	4
Tuberculosis	2	4

The striking feature in this series is not only the fact that 100 per cent gave a history of cough and expectoration but that 72 per cent gave a history of influenza, and 12 per cent gave a history of pneumonia, making a total of 84 per cent giving a history of either influenza or pneumonia.

Thirty-five per cent of the cases showed a temperature varying from 99° F. to 100° F. This was probably due to the fact that they usually came to the dispensary during an acute cold superimposed on the already existing bronchiectasis. The temperature in these cases came down to normal in most every instance in a period of one to two weeks.

Sex. — Twenty were males, or 39 per cent. Thirty-one were females, or 61 per cent.

Lobes Involved.—

- 26 cases—50 per cent were bilateral.
- 15 cases—30 per cent were in left lung.
- 10 cases—20 per cent were in right lung.
- 49 cases—96 per cent were in lower lobes.
- 2 cases— 4 per cent were apical.

Age.—

<i>Age</i>	<i>Cases</i>	<i>Per cent</i>
Under 10	1 (8 yrs. old)	2
10-20	10	20
20-30	12	24
30-40	10	20
40-50	7	14
50-60	4	8
60-79 or over	6	12

The record of age in one case was missing.

Physical Signs.—The physical sign, like the symptoms, correspond more or less closely to the severity of the case.

A. Inspection: Patient is usually well nourished. There is little or no apparent loss of weight. Early cases show nothing important. Advanced cases may show the following: (1) clubbing of the fingers; (2) end of nose bulbous. One such case was in a sanatorium for one year before she was recognized as a case of bronchiectasis. Her condition apparently did not change during the year of residence; (3) there may be unilateral retraction and diminished expansion of the chest; (4) heart is frequently displaced toward the affected side.

B. Palpation: If emphysema is present the fremitus is diminished, but if fibrosis is at all extensive or if cavities are large fremitus is increased.

C. Percussion: The character of percussion note depends on the size of the cavity or cavities, together with the character and extent of the associated parenchymal condition. If infiltration or fibrosis is present the note is impaired. If emphysema is present there is a hyperresonant note.

D. Auscultation: Auscultation is probably of greatest value in the early cases. The breath sounds vary in character but more often are broncho-vesicular or somewhat harsh on inspiration over the main bronchi posterior. They may be absent or diminished in intensity. The varieties of râles heard in bronchitis are frequently heard, the sibilant râle varying from the high-pitched piping or whistling râle to the low-pitched. They may be bubbling or appear in moist showers as coarse, medium or fine râles, depending upon the parenchymal reaction surrounding the affected bronchial structures. In the advanced types these findings may be fairly constant and, although altered by cough, persist. They are most frequently heard over the lower lobes posteriorly and frequently

both through inspiration and expiration interspersed with an occasional sibilant râle. This condition existing from day to day accompanied by a fairly constant amount of muco-purulent sputum and paroxysmal coughing were the outstanding diagnostic features of the disease.

E. *X-Ray*: The x-ray shows nothing characteristic in the early types but the advanced stages of the cylindrical and sacculated forms are very often recognized. The infiltrative or early form is often seen as an increase in the linear densities along the bronchi from hilus to the periphery, especially over the lower lobes. If this picture accompanies the symptoms and physical signs mentioned it aids in confirming at least a chronic bronchitis.

Briefly, some differential points in distinguishing bronchiectasis from two other conditions with which it is frequently confused, pulmonary tuberculosis and abscess, may be mentioned. In pulmonary tuberculosis the sputum contains tubercle bacilli in over 70 per cent of the manifest cases, and repeated sputum examinations help. In tuberculosis the pathological changes in probably 90 per cent of the cases are in the upper lung fields and the findings more constant and uniform. The constitutional signs are more in accordance with the physical findings as a rule.

Paroxysmal cough producing considerable amounts of sputum is not present except in the advanced cases of tuberculosis, when the sputum usually is positive. Febrile reactions are common and quite characteristic. Where the sputum is repeatedly negative on microscopic examination and the x-ray findings doubtful, guinea pig inoculations of sputum may show an occasional case to be tuberculous. The symptomatology of pulmonary tuberculosis is quite characteristic in the majority of cases, the tuberculin test occurs with greater frequency and the physical signs and x-ray reveal parenchymal changes most characteristic.

Pulmonary Abscess: The patient is acutely ill. He has recently recovered from an acute illness or recent operation in the upper respiratory tract after a general anesthetic. There is a history of sudden expectoration of a large quantity of mucopurulent material. The pathological process is usually more localized. The sputum shows a high albumen content and very many elastic fibres.

Prognosis.—This depends considerably on the severity of the condition. Age is a factor. The

young individual seems to respond better to treatment than the older one, where there is more tendency to fibroses.

Rarely, if ever, is there a complete restoration. However, the patient is made acquainted with his condition, for as in tuberculosis the education of the patient plays an important part.

With the means at hand today the outlook seems brighter for these cases than formerly.

Treatment.—Medical treatment cannot be expected to heal cavities of any considerable size, but measurable relief may be given.

1. Clean up all foci of infection of teeth, tonsils and sinuses, and all nasal polypi.

2. A warm, dry climate without sudden and unexpected changes is desirable. In cold climates and in winter the patient should sleep indoors, but the room should be well ventilated and warm.

3. Postural treatment, in which an attempt is made to drain the cavities, is very important and may be effective in a considerable degree. Teach the patient the various postures learned by experience to be effective in the given case.

4. Inhalation of creosote and volatile oils, such as eucalyptus and menthol, will often alleviate disagreeable symptoms but must be continued over several months.

5. Intratracheal injections of creosote, 1 to 2 per cent in olive oil, will also, in some cases, give marked relief.

6. Bronchoscopic suction with local applications as pointed out by Lynah and Yankauer requires long practice and should be handled only by the skilled bronchoscopist.

Discussion.—A patient complaining of "catching cold" easily since an attack of influenza with attacks of paroxysmal cough and abundant expectoration, especially on rising in the morning or periodically during the day, the total amount of sputum 25 c.c. or more in twenty-four hours over a considerable period of time, the loss of weight little or none, and in whom repeated sputum examinations are negative for tubercle bacilli, with the temperature normal or only slightly above, and in whom the pathological process is limited to the bases, should be strongly suspected of having bronchiectasis. X-ray studies should be made and other causes of cavitation should be excluded.

Conclusions.—

1. Bronchiectasis is a relatively common condition of the lungs since our pandemic of influenza in 1918 and 1919.
2. Broncho-pneumonia complicating influenza often leaves permanent lung changes which are important predisposing factors toward bronchiectasis.
3. In our northwest climate where we have sudden changes in temperature, colds are common and may lead to chronic bronchitis and bronchiectasis.
4. This condition is often mistaken for tuberculosis.
5. Treatment consists chiefly in cleaning up foci of infection, warm and dry climate, postural treatment, inhalation and intratracheal injections. Suction with the aid of a bronchoscope may prove to be a very promising method in more advanced cases.

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LOW VIRULENCE IN MILIARY TUBERCULOSIS

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Miliary tuberculosis is a disease the very name of which brings fear into the hearts of the stoutest; it calls up visions of a young patient, lying in bed acutely ill, with flushed face, dyspnea, hyperpyrexia, coma, and in a short time death, inevitable death, the one and only prognosis we are accustomed to associate with this terrifying condition. But is this always so? On rare occasions there is reported a case of tuberculous meningitis with recovery, and the usual comments are that the diagnosis was probably incorrect. Or on an even rarer occasion a case of miliary tuberculosis is reported as having recovered, and again the same comments are made, but with what justification? It is probably true that in the average lifetime of the general practitioner there will occur no recoveries from miliary tuberculosis, and he will see no recoveries of patients of his colleagues who have this same serious condition; and if he does hear of a recovery it is put down to an erroneous diagnosis. Incorrect diagnosis, in fact, covers a multitude of therapeutic accomplishments of his associates.

As we all know (though I have heard expressions to the contrary), tuberculosis leaves an undeniable impression on an x-ray film. If recovery takes place, definite and conclusive evidence remains on the films showing that the tuberculous lesion has healed. There is no such thing as a normal appearing chest, radiographically speaking, if the patient has recovered from a tuberculous infection. The scars of the lesion remain, and that scar tissue, once deposited, remains until the lung decays in the grave. Therefore, if a tuberculous infection has occurred and has healed the roentgen-ray examination shows it, and in addition it will show the type of infection.

In reviewing the pathology of miliary tuberculosis we find that the rapid and widespread development of miliary tuberculosis in the lungs is often part of a generalized tuberculosis. When the lesions are most extensive in the pulmonary tissue, both lungs are apt to be involved. But, as is to be expected, the number, size and character of the miliary tubercles differ in different cases.

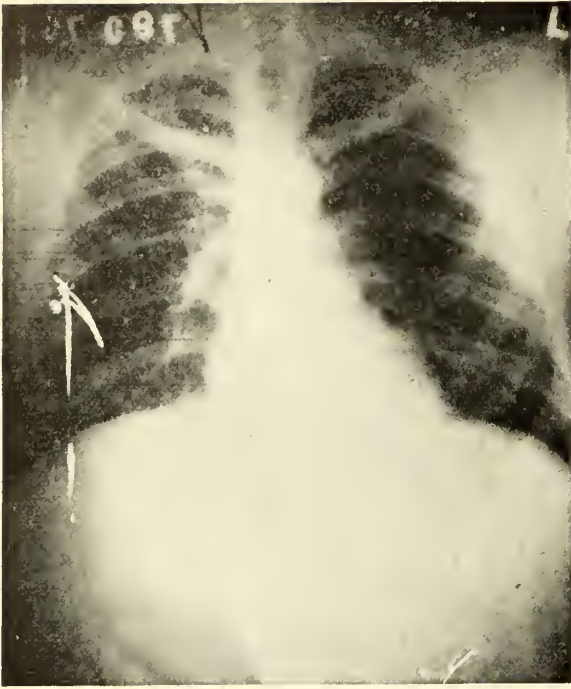


Fig. 1—Miliary Tuberculosis, no signs or symptoms.

The distribution of the lesions is such that the tubercles are found in the parenchyma of the lungs, in the connective tissue forming the septa, in the walls of the bronchi and blood vessels, and in the visceral pleura. They may be scattered singly through the lungs or aggregated in groups; they may be separated by considerable interspaces or be so close together that the lung is rendered nearly solid. While some are so small and transparent that they can hardly be seen with the naked eye, others are larger and more opaque and may have a lighter center marking the area of necrosis. On investigation into the mode of infection it becomes evident that the lungs are infected through the blood vessels or lymphatics, as it is frequently found that the generalized tuberculous infection is secondary to a localized tuberculous lesion either in the lungs or in some other part of the body. As is probably the case in the instances later to be cited, in a considerable proportion of miliary tuberculous infections of the lungs, tuberculous lesions of the bronchial lymph nodes or of the lung tissue itself of greater duration are probably sources of origin of the widely disseminated tuberculous colonies. Not infrequently the tubercles in one section of the lungs are larger and apparently older than those in other sections. It is thus seen that tubercles in the upper portions of the lungs may be more abun-

dant, larger, and more fibrous than in the lower lobes. What is probably true is that in many cases of acute miliary tuberculosis of the lungs whether or not associated with older local tuberculous lesions from which the distribution of the bacilli may have taken place, the generalization has not occurred at once, but by successive fresh infections.

The minute pathology of the lesions is well set forth by Delafield and Prudden, who state that:

"Miliary tubercles in the lungs are in structure essentially similar to those formed elsewhere in the body, except that the filling of the air spaces with exudate makes the lesion somewhat more complicated. The tubercles may be composed of small spheroidal cells or of larger polyhedral cells with more or less fibrous stroma. Giant cells may be present; coagulation necrosis is usual. Such forms of miliary tubercles may be, and commonly are, associated with the presence of an exudate in the adjacent or involved air vesicles. This exudate may be largely made up of exfoliated epithelial cells which have proliferated, or with these there may be serum, leucocytes, and fibrin. The blood vessels within the tubercles which replace the lung tissue are partially or wholly obliterated.

"But the miliary foci of tuberculous inflammation in the lungs may consist wholly of the inflammatory exudate which early becomes necrotic, often with necrosis of the walls of the involved air spaces. Such tubercles, of the exudative type, are apt to occur in children, and usually contain large numbers of tubercle bacilli."

In marked contrast, on the other hand, to the

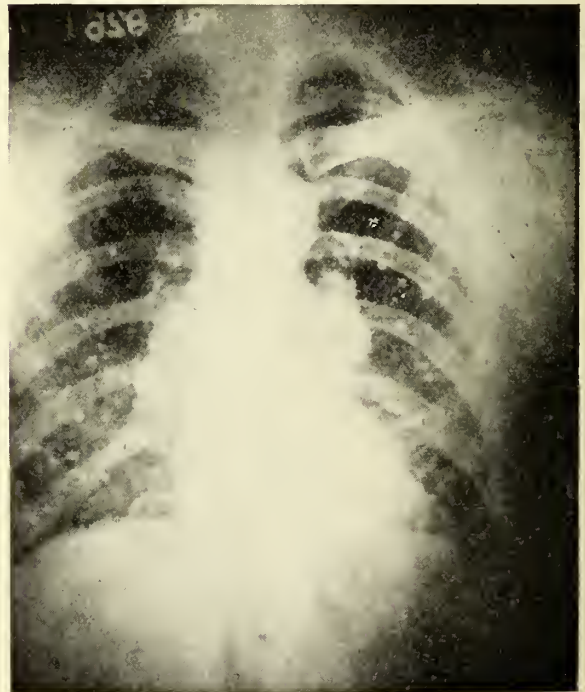


Fig. 2—Miliary Tuberculosis, no signs or symptoms.

exudative type which is so apt to occur in children and which gives such a serious and fulminating lesion terminating shortly in death, the widely disseminated tuberculous lesions in the lungs may, with or without extensive necrosis, become surrounded by, or converted into, masses of dense fibrous tissue, and these fibrous tissue masses may contain necrotic material, or they may even be calcified at the center. While the calcified masses may not contain bacilli, not infrequently the organisms remain alive within them for a long time, quiescent, but still virulent. When these foci of tuberculous inflammation become sharply outlined and discrete, and probably fibrosed or calcified, they are generally referred to as healed tubercles and the process is sometimes spoken of as chronic miliary tuberculosis. The fibrous tissue which forms in and about the miliary tubercles, as well as other tuberculous lesions, is the result of a distinctly reparative process in which the already formed tuberculous tissue or its products apparently act in a manner similar to foreign bodies in inducing fibrous tissue growth.

The following histories serve to illustrate the types of cases in which the mild form of miliary tuberculosis occurs:

CASE 1. Figure 1. C. L., male, white, 28.

Family History.—Father has lung trouble; mother sickly, three operations in last 8 months.



Fig. 3—Miliary Tuberculosis, no signs or symptoms.

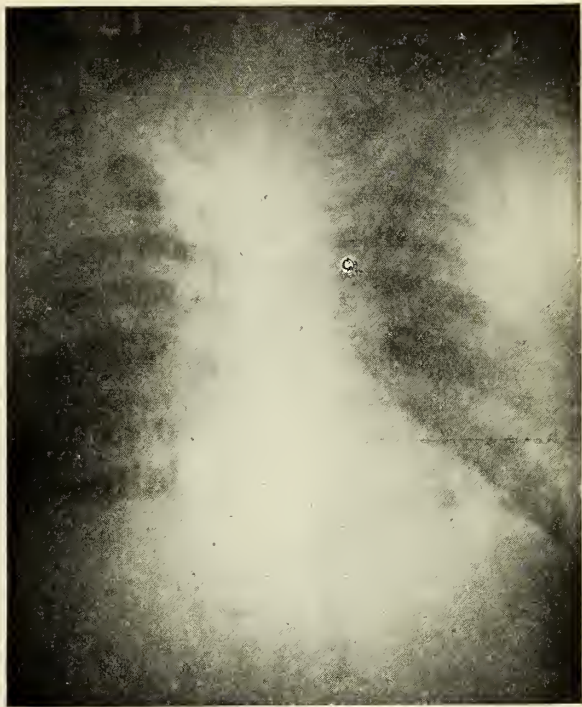


Fig. 4—Miliary Tuberculosis, no signs or symptoms.

Chief Complaint.—Back and lungs hurt all the time; burning urination; headaches back of head and pain in muscles of neck; walking makes him weak in legs.

Previous History.—Usual diseases of childhood; “dropsy” at age of 2 years; pneumonia 8 years ago; legs injured by being run over by wagon at age of 19; genito-urinary negative.

Present History.—Fell while drilling in hot sun; in hospital 10 days and was discharged a short time later on account of spinal trouble; has worked ever since.

Physical Examination.—Patient is well nourished and well developed; chest negative; glands negative; teeth negative; blood pressure, systolic 145, diastolic 95. Neurological consultation shows patient to be suffering from a condition which was thought to be due to some intoxication.

CASE 2. Figure 2. C. W., male, white, 38.

Family History.—Father living and well; mother died during childbirth; one brother living and well. No history of tuberculosis, cancer or insanity.

Chief Complaint.—Swelling of arm; smothering feeling in chest; shortness of breath. Has been short of breath ever since he was gassed. Discharged May 8, 1919. Two weeks later began to have pain in arm. Blood vessels became hard and very prominent. One month ago arm began to swell from fingers to shoulder.

Previous History.—Usual diseases of childhood. Gassed September 27, 1918. Neisserian infection 15 years ago.

Physical Examination.—Blood pressure, systolic 136, diastolic 80; pulse 80. Well nourished. Head negative except

pyorrhea and dental caries. Chest broad and well formed. Findings negative. Abdomen negative. Genito-urinary negative. Extremities, slight clubbing of fingers. Entire left arm somewhat larger than right. Left hand slightly cyanotic. Superficial veins prominent and sclerosed. Glands of left axilla moderately enlarged. Wassermann negative. Urine negative.

Diagnosis.—Sclerosis of vessels of left arm; tuberculous lymph nodes of chest; lymphadenitis left axillary glands; no active chest pathology present.

CASE 3. Figure 3. J. J., male, white, 28.

Family History.—Father dead, 26, blood poisoning; mother living and well; one sister and one brother living and well. No history of tuberculosis, cancer or insanity.

Chief Complaint.—Aching in chest and between shoulders in back; hacking cough; has had night sweats; clearing and swallowing in throat; gas on stomach; unable to belch; pains in stomach after meals; insomnia; nervousness; poor appetite.

Previous History.—Mumps, measles, chickenpox, whooping cough during childhood. Venereal negative.

Physical Examination.—Negative in all respects with the exception of dental caries. Six sputa and one urine were negative.

Diagnosis.—No active pulmonary condition found.

CASE 4. Figure 4. T. C. B., male, white, 42.

Family History.—Father killed in accident; mother died at 50 years, cause unknown; one brother and one sister living and well.

Chief Complaint.—Shortness of breath; headache; cough; pain in region of heart.

Previous History.—Measles; mumps; whooping cough; chickenpox during childhood. Genito-urinary negative.

Present Illness.—In September, 1918, was sick in hospital for about 10 days. Some time later again sick for four or five days; had pneumonia or pleurisy; tonsils and adenoids removed. Since discharge July, 1919, has not been able to follow previous occupation of farmer; can do light work.

Physical Examination.—Negative throughout with exception of double mitral murmurs with slight transmission to axillary line.

Final Diagnosis.—Mitral insufficiency.

A careful perusal of these histories shows that none of these patients had any illness at all commensurate with the widespread pathology found in their chests on roentgen ray examination. It is true that Case 4 had a slight illness of a few days duration but nothing at all to compare with the illness we are accustomed to associate with acute miliary tuberculosis. The illness could have been only one of the mild infections of unknown origin which are so common (influenza, la grippe), and in fact clinically were nothing but that. Let us assume that the infection and illness were due to the dissemination

of the tuberculous masses throughout the pulmonary tissue, as we can find no other historical data to account for the widespread lesions.

Due to some unknown cause, a tuberculous focus in the body, probably in the mediastinum, ruptured and the tubercle bacilli were disseminated throughout the pulmonary tissue. The immunity of the patient to tuberculosis being excellent, although the infection was severe, he became ill, was confined to bed for a few days, and showed all the symptoms and clinical signs of a mild respiratory infection, and in a few more days clinically recovered, and has had no trouble since. The resistance of the patient was so great that even such a widespread reinfection was not sufficient to break down his immunity and the exact nature of the condition was not diagnosed. In Cases 1, 2 and 3, there is no definite history of such an illness. There is no definite time at which an illness of longer or shorter duration can be placed. In fact, there seems to be an absence of practically any kind of an illness except the illnesses of childhood. It means but one thing, that the resistance of the patients was so great that an infection which would be overwhelming in another patient did not affect them in the least. The disseminations of the lesions were not recognized either subjectively or objectively. The disease was one that was below the level of clinical manifestation throughout its course. This does not mean that there may not have been symptoms comparable to prodromal symptoms of other diseases, but it does mean that the patients were never sufficiently ill to necessitate their confinement to bed or cessation from work. The lesions probably could not have been diagnosed clinically or even roentgenologically. It is certain the few râles that probably were present were not sufficient to diagnose miliary tuberculosis, and the groups of tubercles were not sufficiently fibrosed or calcified to show on the x-ray films. It is presumed that there were no areas of pneumonic consolidation surrounding the groups of tubercles, which probably would account for the lack of clinical manifestations.

In a review of 3,500 roentgen ray chest examinations, it was found that a greater or lesser dissemination of tubercles occurred in somewhat less than one per cent of the cases examined. Arbitrarily fixing twenty-five calcified tubercles as a minimum, tuberculous calcified foci were found in thirty-four cases, an incidence of about one in 106 cases examined, or approximately 0.96 per cent. The num-

ber of healed tubercles ranged from about twenty-five to several hundred, and on stereoscopic examination they were found to be scattered all through the lungs, from the extreme apices to the extreme bases, as well as on the pleura. It must be remembered that, in fixing twenty-five calcified tubercles as an arbitrary minimum for the diagnosis of healed miliary tuberculosis, a still greater number of cases are excluded which contained five or ten or more of such calcifications. In the strict sense these are just as truly cases of healed miliary tuberculosis as the more widespread lesions, but it was assumed that unless a sufficient number of lesions was present which we might suppose ought to give clinical symptoms, this review of these examinations would not clearly bring out the point under consideration, which we all know, but which has not been clearly crystallized in most minds, and that is that miliary tuberculosis is not necessarily a serious disease; that it occurs much more frequently than we generally assume it to be present; and that it may be absolutely below the level of clinical, or even subjective, manifestation.

It has been shown that the patients to whom an infectious accident occurs, following which there is a widespread dissemination of tuberculous colonies throughout both lungs, have a remarkable resistance to the toxins produced by the bacteria, and, without difficulty, in a short time calcify the tubercles and heal the lesions. As we know, there are times when a patient who normally has good resistance to infection may, through stress and strain of some unusual hardship, temporarily lose his comparative immunity to the disease and fall a victim to its ravages. In this the tuberculous patient is no exception.

CASE 5. Figure 5. J. J., male, white, 29.

Family History.—Two brothers, ages 36 and 40, dead, tuberculosis.

Previous History.—Measles during childhood. Fracture of thigh in 1920. Neisserian infection in 1916.

Present Illness.—In December, 1917, was unable to do active duty on account of pains in chest, dyspnea and swelling of extremities. Discharged S. C. D. in January, 1918, cause not known to claimant. Since discharge has had to quit work frequently on account of loss of strength. Has had several small hemorrhages since.

This patient, as the patients of the first group, also met with an accident which disseminated the tuberculous foci throughout his lungs, and overcame them. As a matter of fact, the lesions were not entirely healed; there remained a few scattered

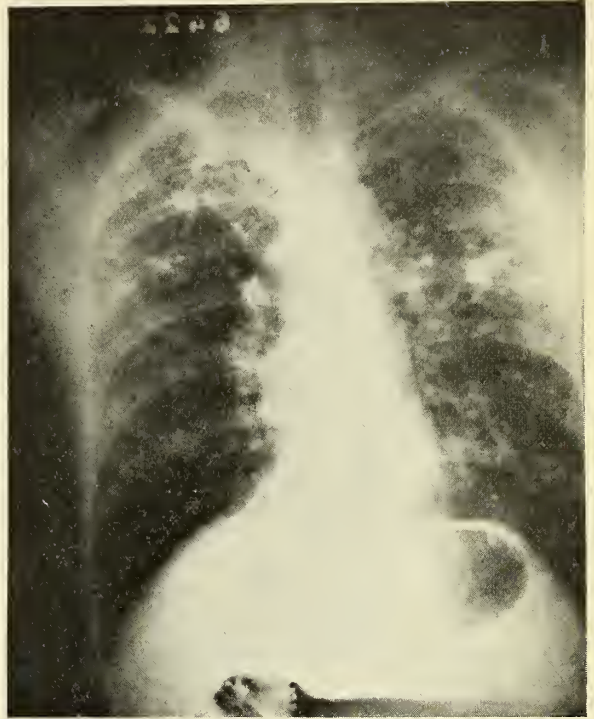


Fig. 5—Miliary Tuberculosis, healed and reactivated.

areas where calcification was not complete and the activity of the tubercle bacilli was not entirely inhibited. Under the duress and physical strain unusual for the patient, the latent foci of infection were reactivated, and the tuberculous lesion spread, not by redissemination but by contiguity, and the usual lesions of chronic pulmonary tuberculosis are seen in association with the lesions of a widespread, partially healed, miliary tuberculosis. Had this patient not been put under the unusual strain to which he was subjected, in all probability resistance to the first (the miliary) infection would not have been lessened and he would have recovered in the same manner as the patients of the first group. Once his resistance was definitely broken down, he succumbed just as readily to pulmonary tuberculosis as his equally unfortunate brothers who never developed the high resistance that this patient had initially. He seems to be going on the same downward path which is all too familiar to the practitioner of medicine who so vainly strives to arrest the disease. It may be that the condition will, in time, be arrested, possibly more easily than would have been the case had he not had the initial high resistance, but it is only by following the case through for many months, or even years, that this can be ascertained.

To summarize the facts set forth, it was seen that miliary tuberculosis is frequently a mild infection which may be below the level of clinical manifestation. It may even be that the patient does not know that he has any unusual conditions affecting his lungs. This lack of clinical phenomena is probably due to the high resistance of the patient, or even possibly the low virulence of the infecting organism, although the former is probably the case. The condition can probably not be diagnosed clinically except as an acute bronchitis. With the aid of the x-ray it is possible that the condition may be diagnosed; but even this is doubtful, as the tubercles would have to be recognized by the pneumonic exudate surrounding each one. If these areas of pneumonic consolidation were at all numerous, the absorption of toxins from them would in all probability lead to clinical manifestations of greater severity than merely those of a mild respiratory infection; so it is probable that no great amount of local reaction is present and therefore not roentgenographically diagnostic. It was found that these widespread infections occurred once in every 106 chest examinations made. The percentage will probably be higher in a private laboratory, as in this service chest examinations are made on the slightest complaint, and even for no complaint at all; and certainly the percentage of normal chests is much greater than in the private laboratory. Patients showing an initial high resistance to tuberculosis may, under physical strain, break down and the usual form of pulmonary tuberculosis ensue.

Another point of interest, and one not unexpected, is that none of the patients who showed the dissemination of the tuberculous colonies were colored, although their incidence was about 20 per cent. In them probably a widespread dissemination of tuberculous foci would result only in acute miliary tuberculosis with rapid exitus.

STRANGULATED HERNIA, WITH A REPORT OF CASES*

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The examination of 500,000 men for employment in the industries showed that 2 per cent had hernia.⁴ About 92 per cent of all hernias are of

the oblique inguinal type (Prof. Paul Berger). Recurrence in hernias operated upon is less than 5 per cent.¹⁸ Strangulated hernia makes up less than 1 per cent of all hernias operated upon. Inguinals are the most frequent, then ventral, umbilical and femoral.

Strangulated hernia when first seen usually has been severely handled by the patient, and whatever further manipulation is done should be with a view to establishing the diagnosis. Reduction by taxis is sometimes attempted even by manipulation under an anesthetic, often with appalling results; for the condition may have progressed so far before recognition that an acute suppurative process within the strangulation may, after reduction, result in the development of a general peritonitis, and surgical intervention be too late to prevent a fatality. Ochsner states that "taxis requires a gentleness and skill that can be acquired only by practice." As the average physician has not the opportunity for this practice, it is but natural that we should condemn this method of treatment.

Once the diagnosis of strangulation is made, surgical intervention is imperative, and any further effort at reduction is not only brutal but dangerous, as illustrated by Kornder's reports mentioned below, and one case which I shall report further on.

When surgical relief is finally consented to in these cases, much valuable time has elapsed and the time for examination and observation is limited. But enough time should be taken to make urine and blood analyses, because of the assistance given by these findings in determining the type of anesthetic best suited for the case, and the possibility of the presence of some acute, suppurative process, either within the strangulation or intra-abdominally situated. This is illustrated by the report by Kornder⁵ of five cases of strangulated hernia complicated by acute appendicitis; also by one case in this series complicated by acute suppurative appendicitis, and two cases which showed the presence of diabetes.

The question of anesthesia is an important one, and there are several factors to be considered before a definite decision is made. Most hernias becoming strangulated have been of long duration and usually are the irreducible type. They invariably have received a considerable amount of trauma before surgical intervention has been con-

*Presented before the Ramsey County Medical Society, St. Paul, December, 1921.

sented to; often marked histological changes have taken place in the tissues, with edema separating the sac from the surrounding tissues and adhesions within the sac requiring quite an amount of dissection. These cases are much better suited for general anesthesia, because operative time is shortened and the chances for reaction and shock are thereby minimized; also the danger of infection is greatly reduced, as these cases, when operated under local anesthesia, require an extensive infiltration of the tissues where large omental adhesions are present, with greater chance for infection of the peritoneum. And if this is not done, the freeing of these adhesions is found quite difficult and even painful under local anesthesia. Those hernias which do not show evidence of a truss having been worn, or are not over large, are more suited for local anesthesia, and local anesthesia is the anesthesia of choice with most of the experienced operators. Statistics show that the mortality rate has been greatly reduced, especially in cases of advanced age, in this type of intestinal obstruction operated under local anesthesia.

The inguinal type, because of its peculiar innervation, is especially suited for local anesthesia; and usually complete anesthesia is produced after the first deep intramuscular injection. This is because of the ease of exposure of the deep structures in the field of operation and the small amount of tension or pulling required on the peritoneum and mesentery after the sac is opened.

A brief description of technic is as follows: The point of the needle is introduced under the skin, two fingers' breadth below the anterior superior spine and about one inch mesially; the skin and subcutaneous tissues are infiltrated obliquely downward and inward for the length of the needle in the line of the hernial incision, 0.7 per cent novocain without adrenalin being used. Then the needle is withdrawn to the original point of entrance, and is directed downward and inward at an acute angle, feeling for the resistance of the external oblique muscle; when this point is reached 10 c.c. of the solution are injected. The needle is then withdrawn and injection made at the lower end of the skin wheal, carrying the solution under the skin to the point selected below the lowest point of the site of the incision. The incision is then made through the skin and fascia, and the external oblique is opened parallel to its fibers above the internal ring; the flap turned back usually exposes

the ilio-inguinal nerve lying on the internal oblique about 0.5 cm. from its outer border. The nerve is injected with a small quantity of the novocain, and the lower end of the external oblique is opened through the external ring. Next a crescentic injection is made just above the internal ring starting from the outer side, and this generally anesthetizes the ilio-hypogastric nerve which is in this region, and usually completely anesthetizes the field of operation so that when the sac is dissected from above and opened there is no discomfort. After the strangulation is relieved and the sac is to be ligated, the circle is completed by injecting the lower and inner side of the sac, which is then ligated and removed, and the operation completed.

Femoral hernias are usually small, and easily relieved and repaired by the use of local anesthesia. The method followed in this type of case is one of infiltration, as the nerve supply in this region is not so definitely located and small nerve branches are numerous. The simple technic is as follows: Injection of the anesthetic is started above the hernia and infiltrated under the skin in a straight line parallel to the long axis of the limb, over the prominence of the hernia to its lower margin; then the skin and fascia are opened and lateral infiltrations are made around the body and neck of the sac, which is then opened and the bowel pulled down and inspected. Next the peritoneal side of the sac is injected close up to its constriction, then is freed from the surrounding tissues by blunt dissection, ligated and reduced. Often it is necessary to stretch or nick Gimbernat's ligament before reduction can be completed. After this is accomplished the sac is ligated and the hernia repaired.

In intestinal obstruction occurring within the abdominal cavity the tendency is toward resection more often than in strangulated hernia, as illustrated by Field, Hoguet, Barnett and Kornder in their reports on strangulated hernia, and a review of the literature on intestinal obstruction. The mortality rate in intestinal obstruction has not materially changed in the last fifteen years; but there has been a marked improvement in the mortality rate of strangulated hernia. Keen gives the mortality rate of strangulated hernia operated in the first twelve hours of strangulation as about 3 to 5 per cent, and Ochsner's Surgery gives the mortality rate of acute ileus as 40 to 50 per cent.

This decrease of mortality in cases of strangulation is not only traceable to earlier intervention, improved technic and local anesthesia, but I believe is also due to resistance both local and general, which is developed against the toxic substances which are found in the obstructed bowel, and which so often result fatally in these cases resected.

The majority of cases of hernia which become strangulated usually have been irreducible, and the history of these cases shows frequent trouble with difficult reduction or relief from pain in these regions, with constipation over a long period before the final strangulation is produced. And it seems but logical to assume that these cases suffered from strangulations which were of shorter duration and eventually released themselves. But during this time toxic bodies were produced within the intestinal tract, and undoubtedly trauma was caused to the mucosa of the intestine strangulated; therefore these toxic substances could be absorbed by the traumatized intestine in sublethal doses, and would produce a reaction with the formation of local and general resistance.

Whipple¹⁶ has isolated the toxic substance occurring in these cases which he reports as a primary proteose, and further states that this proteose intoxication may be associated with a rise in the incoagulable nitrogen of the blood to four and even ten times normal, and suggests a possible value in the diagnosis and prognosis in intestinal obstruction.

Brooks, Schumacker and Wattenberg¹⁵ state that an isolated occluded loop of bowel will contain a large quantity of very toxic material which is not absorbed by the normal intestinal mucosa. The belief that the acute symptoms of intoxication may follow the relief of intestinal obstruction after the toxic fluid has passed into the normal bowel distal to the obstruction, is disproved by many experiments; and they further state that the patient may grow rapidly worse after the release of the obstruction, but the reason for this is that the patient has already absorbed a lethal dose of the toxic substance and the operation is merely an incident in hastening the fatal onset. Also, where resection has been done the mucosa has been damaged, giving an avenue for a much more rapid absorption of the toxic substance.

Brooks¹⁵ states there are two important factors in the production of symptoms in intestinal ob-

struction: (1) the production of toxins, and (2) absorption of toxins; and as absorption of these toxins produces the symptoms, the prevention of this absorption naturally will prevent or relieve the symptoms. As the normal mucous membrane will not absorb the toxins, any surgical procedure such as resection or drainage with its denuding of mucous membrane, will give a route of entrance for the toxins. But even though the most meticulous care is exercised in making a resection, there still remains a larger area of denuded mucous membrane for absorption than would be caused by drainage. The selection of drainage in preference to resection is obvious, because the area of absorption is smaller, trauma is less, and a more rapid and direct route for the elimination of the toxins is established; also the operative time is shortened. Therefore, I believe the two-step operation is definitely indicated when resection is necessary.

The following is a report of cases operated under local and general anesthesia.

CASE 1. Baby Arthur K., 13 months old. Strangulated right inguinal hernia; duration 48 hours. Tense abdomen; pain; fecal vomiting. Immediate operation January 16, 1919, ether anesthesia. Exposed a strangulation of the ileum and lower end of cecum and appendix. Evacuation of 200 c.c. of blood around the strangulation. Appendix was acutely suppurative and gangrenous over the tip, and was removed. The rest of the large bowel and ileum was edematous and very dark; this was packed in hot towels, color improved; sac resected; hernia repaired. Discharged cured 14 days after operation.

CASE 2. Mr. M. P., 29 years old. Strangulated right inguinal hernia, 48 hours' duration. Abdominal pain, distention, fecal vomiting. Immediate operation March 25, 1919, ether anesthesia. Two feet of strangulated bowel and omentum exposed; edematous and very blue, and in spots black. Two hundred c.c. of sero-sanguineous fluid evacuated around the bowel. Color returned after application of hot saline towels. Bowel reduced; sac resected; hernia repaired. Patient discharged cured 16 days after operation.

CASE 3. Mr. A. McL., 65 years old. Strangulated right inguinal hernia, 24 hours' duration. Constant and excruciating abdominal pain referred to right inguinal region. Persistent vomiting of a fecal nature. Operated April 7, 1919, ether anesthesia. Twelve inches of blackened and strangulated bowel exposed. Evacuation of 400 c.c. of blood and blackened clots. Strangulation relieved by incision from above constriction. Hernia repaired. Patient discharged well 14 days after operation.

CASE 4. Mr. F. K., 41 years old. Strangulated right femoral hernia, duration ten hours. Pain and tenseness over hernia; vomiting. Operated December 2, 1919, ether anesthesia. Strangulation of six inches of small bowel;

good condition. Returned to abdominal cavity. Hernia repaired. Patient discharged well 14 days after operation.

CASE 5. Mr. A. N., 49 years old. Strangulated left inguinal hernia, duration 24 hours. Severe abdominal pain directed to the left inguinal region; continuous. Vomiting of a fecal nature; marked distention and acutely sensitive especially over the lower left quadrant. Diagnosis of strangulated pro-peritoneal hernia. Operated September 15, 1920, ether anesthesia. Left mid-rectus incision made. On opening peritoneum evacuated about 2,000 c.c. of a sanguineous fluid. Examination showed a long, tense band of small intestine extending down to the left internal ring, where it was strangulated, and the remainder of the small intestine was wrapped tightly around this. Strangulation was at a point two and one-half feet from the cecum and was easily released, and the mass of intestines brought out of the wound, hot towels being packed around them. About 15 feet of small bowel was uniformly edematous and blue and in spots very dark, but the surface was still smooth and shiny. Some improvement in color was noted after warm saline packs were placed about them. Abdomen was mopped dry. Intestines returned, and closure with drainage. Fourteen days after operation, left inguinal hernia was repaired under local anesthesia. Convalescence uneventful. Discharged well 28 days after beginning strangulation. Diagnosis of strangulated left inguinal hernia and volvulus of two-thirds of small intestines.

CASE 6. Mr. S. LaB., 29 years old. Strangulated left inguinal hernia, duration 30 hours. Abdominal distention, vomiting. Operated September 18, 1920, ether anesthesia. Strangulation found at the external ring. Tissues all edematous, and about 200 c.c. of a sanguineous fluid around small intestine and omental strangulation. The omental strangulation ligated and removed, and hot saline packs placed around the edematous and darkened bowel. Some improvement in color. Bowel reduced and hernia repaired. Patient discharged well 14 days after operation.

CASE 7. Mrs. D. W., 48 years old. Strangulated umbilical hernia, with marked obesity. Duration 29 hours. Gripping pain extending across the upper abdomen; acute distention; difficult respiration and fecal vomiting. Operated October 9, 1920, ether anesthesia. Old omental adhesions found about hernial sac, and two feet of small bowel strangulated, edematous, cyanotic and injected. Strangulation relieved by lateral incision in the neck of the sac. Bowel and omentum returned to abdominal cavity and hernia repaired. Convalescence uneventful. Discharged well 20 days after operation. The interesting feature of this case was the great obesity in the patient; the long thickened sac was sutured transversely on its peritoneal surface, and then double imbrication of the remainder of the sac was performed with suturing over of the rectus muscles in their sheaths, these muscles appearing like two long bands of fascia.

CASE 8. Mr. N. B., 63 years old. Strangulated right inguinal hernia. Twelve hours' duration. Abdominal tenderness, distention and pain in lower right quadrant; acute tenderness over the right hernial region. Operated October 12, 1920, ether anesthesia. Strangulation of small part

of the ileum. Bowel was congested and cyanotic. Returned to abdominal cavity. Hernia repaired. Discharged well 33 days after operation.

CASE 9. Mr. John D., 67 years old. Strangulated right inguinal hernia, duration 12 hours. Pain in the right inguinal region; distention and prostration. Operated November 5, 1920, local anesthesia. Small loop of ileum strangulated but in good condition. Returned to abdominal cavity. Operation completed. Patient developed pneumonia two days after operation. Discharged well 21 days after operation.

CASE 10. Mr. F. G., 56 years old. Strangulated left inguinal hernia, duration 24 hours. Vomiting, acute distention; severe acute and continuous abdominal pain. Operated October 30, 1921, ether anesthesia. Evacuated about 700 c.c. of bloody fluid and clots about bowel. Two feet of small bowel strangulated, quite blue and darkened in spots. Packed in hot towels, after which returned to abdominal cavity. Hernia repaired. Discharged well 14 days after operation.

CASE 11. Mr. W. R., 64 years old. Bilateral femoral hernia, with left strangulated, duration ten hours. Acute abdominal pain on left side and distention and tenderness over the femoral hernia. Operated November 15, 1921, ether anesthesia. Exposed a strangulation of six inches of small bowel, quite red and edematous, good condition; also adherent omental strangulation which was grayish blue. This removed and hernia repaired; also repaired right hernia. Discharged well 21 days after operation.

Where the viability of the bowel is in doubt, or gangrene has started, it is imperative to resect. With the one-step operation the mortality rate is bound to be high, and it seems but logical that when this necessity arises the mortality rate will be greatly diminished if the two-step operation is performed, and the bowel drained at the site of the strangulation. The second step in the operation should not be done until such time as all local sepsis has completely disappeared and the general systemic toxemia has subsided. Then an end-to-end or side-to-side anastomosis can be made and cure of the case effected.

While the consensus of opinion is that the site of operation should be over the strangulated area, I believe small properitoneal hernias should be exposed by opening the general peritoneal cavity through a rectus incision, as the strangulation is usually so small that when the sac is opened it is often released and slips back in the general peritoneal cavity. Then it is not only difficult but often impossible to bring out the strangulated bowel again through this opening to ascertain its viability. This was definitely shown in Case 5, given above, where over two-thirds of the small

bowel was very edematous, cyanotic and blackened in spots due to a volvulus around a smaller loop of the bowel which showed but a two-inch strangulation at the internal ring.

In the post-operative care of these cases, no one procedure has done so much in aiding recovery and reducing the toxic state as the use of tap water given subpectorally. The advantage of this procedure is: (1) the known definite amount of fluid which is put into the body and absorbed; (2) the more rapid absorption which is taking place; (3) elimination by the kidneys of toxins absorbed from the bowel; and (4) the increased fluid output in the upper bowel with a dilution of the toxins in the lumen, and a greater lavage to the area of bowel that was obstructed.

Gastric lavage was not done in any of the cases reported above, following operation, but liberal quantities of warm water were given by mouth, which was promptly vomited and cleansed the stomach in this way.

CONCLUSION

1. Strangulated hernia makes up less than 1 per cent of all hernias operated upon.

2. Reduction by taxis should not be attempted unless one has had special training in this procedure.

3. Choice of anesthesia should be governed by the physical and laboratory findings.

4. The two-step operation is indicated where resection is necessary.

5. Resistance to the toxins is greater in cases of strangulated hernia than in those of acute ileus, possibly due to an acquired local and general resistance from frequent strangulations of short duration.

6. Toxins are produced in occluded loops of bowel, but are not absorbed by the normal mucous membrane.

7. The mortality of strangulated hernia has been greatly reduced due to earlier surgical intervention, improved technic, local anesthesia, resistance acquired by the individual, and the forcing of fluids by subpectoral and bowel infusions.

NOTE.—Since the writing of this paper I have operated four strangulated inguinal hernias under local anesthesia in patients over 76 years of age. In one case, the man being over 88 years of age,

the two-step operation was done, and the fistula formed by this operation closed without any further surgical procedure. All cases recovered.

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THE PART OF THE PRACTICING PHYSICIAN IN PUBLIC HEALTH WORK*

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Minneapolis

To many practicing physicians, and particularly to the specialists of today, a subject such as this must seem quite devoid of significance, almost fantastical. And yet it is a subject on which the medical profession, especially its younger generation, can with profit spend some serious thought. Like our forefathers, we have been taught to regard the physician as the most altruistic and public spirited of men and his vocation as most deserving of a leading place among those learned professions which men follow "from higher motives than mere gain." We have felt what Robert Louis Stevenson expressed: "The physician is the flower (such as it is) of our civilization; and when that stage of man is done with, and only remembered to be marvelled at in history, he will be thought to have shared as little as any in the defects of the period, and most notably exhibited the virtues of the race." Having, throughout the ages, been truly honored and respected of all men, is it not well to occasionally hesitate long enough to take our bearings and calculate our position in relation to the educational, political, economic and social progress of the time.

The past few decades, and particularly the past few years, have brought forth many unbelievable changes in society and in industry. The slaves have been liberated; labor unions have been formed and are now recognized as being compatible with democracy; women have been granted equal suffrage rights with men; nation-wide prohibition has come and come to stay; imperialism, as typified by Prussianism, is now merely a fact of history; bolshevism has for almost four years held sway in the largest country in the world; state education has become axiomatic; employees share in the profits of some of our largest industries; "National Health Insurance" has become a law and pronounced desirable in England; and "Workman's Compensation"—a big step in the direction of social insurance—has been adopted by nearly all of our own states. Each one of these changes, which we now accept with hardly a second thought, represented a radical departure from the accepted

practice of the day. Many of them affected, directly or indirectly, the medical profession, but in no instance did the medical profession provide the motive power that brought about the legislation. On the other hand, the interests of the medical profession have in most instances been left entirely out of consideration and the profession has been compelled to adjust its policies as well as possible, to meet the changed conditions which it had little or no voice in determining.

It is decidedly pertinent to ask the question,—how has this change of attitude toward the medical profession come about? Why has this profession been disregarded—the profession which above all others has been considered the most learned and which for centuries was studied by the leading statesmen and philosophers of the European world in order that they might obtain that broad vision and humanitarian viewpoint on which it was founded? Voltaire wrote, almost two centuries ago: "Men who are occupied in the restoration of health to other men, by joint exertion of skill and humanity, are above all the great of the earth. They even partake of the divinity, since to preserve and renew is almost as noble as to create." Why is it that a profession composed of such men is now rarely consulted, even on issues which directly concern its own welfare? Surely it is not because our physicians are ministering less efficiently to the ills of mankind! Surely they are not rendering less skillful service to their patients! On the contrary, medical science has made invaluable discoveries concerning the causes and processes of disease, and undreamed-of advances in treatment and prognosis. Our medical schools have been improved and the standards have been raised so that the graduate of today is more highly trained than ever before. After having spent at least seven years in scientific study, he goes out into the community, a more thoroughly trained scientist than the medical school has ever supplied to the country before. Surely, we answer, the fault cannot be there. And yet, if we analyze it carefully, is it not possible that the seed of the trouble lies in that very intensive and prolonged scientific training which he undergoes? Does he not devote himself so undividedly to scientific study, and does he not confine his interests so exclusively to the sequestered laboratory and clinic room, that he completely loses touch with the pulse of the world? Does he not become so highly specialized that his interests, and hence his sphere of usefulness, be-

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come narrow and very limited? And does not all of this tend to make the physician of today unsocial, undemocratic, self-sufficient and self-centered?

In the field of Public Health the absence of interest and leadership on the part of most of the medical profession is becoming apparent, and more and more the instigation, control and direction of health movements is passing into the hands of the laity. This is a perfectly natural sequence of events, because, as the public realizes the possibility of procuring for itself a greater degree of protection against disease, it demands leadership. Failing to find this among those best fitted to assume it, enthusiasts from among its own members naturally spring up as leaders. The medical profession holds itself aloof and remains passive when some health measures are being proposed; against others it voices bitter opposition. One of its reasons frequently given for this, and the one which the public usually interprets as being the *greatest* of its reasons, is that the proposed measure is considered to be inimical "to the best interests of the profession." The public, not realizing that the best interests of the profession usually represent also the best interests of the public, has now come to view with suspicion any opposition which is voiced by the profession. Take for example the bills for the licensing of chiropractors or other untrained cults: the medical profession, realizing the danger to the public of such legislation, opposes it and yet their opposition is considered by many as merely an attempt to protect their own selfish interests. There is today a broad gulf of misunderstanding between the public and the medical profession and it seems that the means for bridging this gulf must come from the side of the profession. General health education and unselfish interest in public welfare are the timbers of which the bridge must be built.

There is no other profession which has contributed so much in the way of scientific discoveries and which has so unselfishly given of its information and services to the public in order that suffering might be prevented and death rendered more remote. The Public Health Movement owes its inception and growth almost entirely to medical men. The science of bacteriology, which was established by medical scientists, has become the basis for previously impossible progress in the prevention and control of disease. Cholera, yellow fever and bubonic plague are now almost unknown; while

typhoid fever, dysentery, small-pox, malaria and others take a much smaller toll of human lives than was their lot a few years ago. In all of this, which has made possible the saving of several millions of human lives, it was the medical men who gave to the world the information as to how the disease could be prevented and it was the same group of men who instigated the legislative action which provided for the public the greatest possible protection.

Why, then, in the present day, is public health work passing more and more into the hands of the untrained laity? Why do we find many physicians not only unco-operative but actually antagonistic to health movements, official as well as voluntary? Why, to epitomize all such questions, is the medical profession losing its position in the vanguard of public health and welfare movements? Does not the answer lie in the fact that, in our absorption in scientific problems, we have lost sight of the fact that we are an integral part of that social complex called the community, and have failed to realize that "the time is at hand when the public are no longer to be thought of as beneficiaries in the public health movement, but are to be trusted as participants"?¹ Having failed to promptly recognize these facts and to keep up an active participation in the readjustment and reconstruction that is going on in the world, has not our profession been preceded by the economic and industrial interests in the recognition of the necessity for constructive health legislation? Dr. Otto P. Geier expresses it forcibly when he says: "It is for the medical profession at large to determine what place it will hold: whether in the swift current of thought, or in the quiet eddies; whether to stay on the edge of life, or close up to the great melting-pot of human experience; whether to remain in billet or press on to the firing line where men are fighting for life's goal."²

So much for the past and present! What of the future? The fact that government reports show that one-quarter of our yearly mortality and more than a half of our yearly morbidity are due to preventable diseases is sufficient evidence that, however much has been accomplished, much more remains to be done. The physical examinations which we performed on entering students at the University of Minnesota last fall revealed the fact that more than 50 per cent of the boys and girls, who were selected to receive higher education at the expense of the state, had one or more physical

defects which would handicap them more or less seriously, not only in college, but also in later life. And practically all of these defects could have been easily prevented or corrected had the boys and girls received the proper care and instruction in early life. Infant mortality has been very greatly reduced and yet almost 10 per cent of the babies which come into this life die before they learn to walk and talk. A committee on Industrial Waste, appointed by Herbert Hoover, reported in September of last year that "the 42,000,000 men and women gainfully employed (in this country) probably lose on an average more than eight days each year from illness disabilities."³ Calculations based on these figures indicate that more than a billion dollars a year are lost in our country by idleness occasioned by illness. These are but a few examples of the possibilities with which health work is confronted.

Now, with such possibilities before us what is the program which will most efficiently make for their realization? Clearly we cannot longer rely on sanitation and legislation. We must turn to the individual, concentrating on persons rather than on things. We must provide for three things: for adequate and efficient health organizations, for sufficient medical service and for the education of the public. To accomplish these purposes leaders are needed and the co-operation of all who are qualified to contribute, most notably of the medical profession.

The provision of more adequate and efficient health organizations will come as the public realizes their value. Even now health work is no longer the haven of the unsuccessful practitioner of medicine, for it offers possibilities for service and accomplishment which are attracting the ablest of our younger men and women. This work needs specialists, men who have the community and not the individualistic point of view, men who are well paid and who are in no sense in competition with the practicing physicians. The establishment of schools and curricula of public health is making it possible for the country to procure such men, and, being available, they should be demanded. They will become the allies, the co-workers, the consultants, and the aides of the physicians in practice. Such men should be demanded not only by cities, but rural communities also should and will have their full-time sanitarians and their centers of health.

In an efficient health organization a competent

sanitarian, or officer of health, with his laboratories, clerks and public health nurses is most essential, but he cannot succeed alone. He needs must have the co-operation and support of every practitioner of medicine in the community. It is the physician who should be the prime mover in the procuring of efficient health organizations and administration; he should support actively and whole-heartedly, never opposing by word, deed, or disinterested aloofness, movements for better health; he should be the leader and the director of public opinion in all health work. If, as is not infrequently the case, the physician discovers that unsatisfactory or incompetent service is being rendered in some phase of health work, he should use his influence and devote his energy toward improving the service and not arbitrarily oppose a practice that is inherently right.

The second problem, that of providing adequate medical service, is one which is constantly claiming the attention, not only of the medical profession, but also of the public. We have 110,000 doctors in the United States to care for our 115,000,000 population—about one doctor for every 1,000 people. Does it necessarily follow that every citizen is receiving adequate medical service? A study of any community will convince that it does not. The great majority of our adult men and women have never had even one complete physical examination. Practically all large colleges and universities have recognized this fact and have established some sort of health service for their students. The experience of any of these services will supply further evidence on this point. At the University of Minnesota, with a student body of approximately 10,000, we have during the school year an average of between 150 and 200 calls at the students' clinic per day for medical advice or treatment. If this same ratio held for the whole country, doctors would have an average of more than twenty patients per day, exclusive of bed cases. It is apparent that even our supposedly intelligent people are not receiving adequate medical service. Whether or not they themselves are to blame, the fact remains, and some solution will be demanded. Let us hope that the medical profession will take an active interest in this problem and provide the solution. This leadership is essential, not only that the future of the profession may be safeguarded, but also that the public may be protected from those radical measures which perniciously active reformers may at any time pro-

pose. Dr. J. C. Litzenberg ably epitomizes this question when he says: "It will not do to simply organize opposition, for that will be interpreted as a selfish attempt to protect our own interests, but the question must be tackled in a broad-minded way. We must look upon our profession, not as a business alone, but as a calling as well, which in itself implies public service. We must realize that the public is so vitally interested in the practice of medicine, that in many ways it is more or less of a public utility, which means that our decisions must at all times take the public into consideration and into our confidence, otherwise we may have to submit, as public utility corporations do, to public control which will give better results by mutual understanding and concessions than by compulsion."⁴

The third phase of the health program of the future, the education of the public in the means by which health may be conserved and disease prevented, is a most difficult but at the same time a most necessary public health measure. Today the diseases which are causing most of our morbidity are transferred by the contact, direct or indirect, of a well person with one who is infected, and in these diseases we can hope to obtain definite reduction only by instructing the individual as to the means by which he can protect himself and his community from infection. Education is the keynote to better health and the death knell of the quack and the charlatan. The University has taken the lead in health education by the establishment of a department of Preventive Medicine and Public Health. The rest of the state should follow this example, doing so with the co-operation and under the direction of public spirited physicians. Dr. W. S. Rankin recently suggested a most satisfactory and con-

crete program by means of which the local medical societies may take the lead in this most important work⁵. The process of general health education will of necessity be slow, but, when accomplished, the public not only will comply with the exhortation, "know thyself," but also will realize that health is truly a purchasable commodity—a treasure which anyone can have if he is willing to pay the price. With this understanding the popular idea that health is something to be doled out by charity organizations will at once be thrown into the discard.

To summarize, the public health program of today may be divided into three parts: the establishment of adequate health organizations, the provision of sufficient medical service and the health education of the general public. In each of these the practicing physician should play a most important rôle. Mere passive interest on his part is not sufficient. It will never prevent enthusiasts and reformers from providing the solution to problems which are of most vital importance to the medical profession. Active interest in health work is essential. Participation is the duty of each and every physician.

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EDITORIAL

Medical Practice

The Minnesota State Medical meeting at Minneapolis may be likened to a squall that ruffled the rather turbulent waters of the present medical situation. It is generally admitted that the practice of the healing art is going through a definite transition stage brought about in part by the development of the medical specialties and in part by the so-called cults, with the tendency toward state medicine ever lowering in the background.

Specialism has led to the formation of clinical groups, and group practice has its champions and detractors. There is little question, however, but that group practice has its advantages and has come to stay. Specialists are absolutely necessary and their need will become even more apparent as the science and art of medicine develops further. On the other hand, there will ever be a demand for the general practitioner to handle the large percentage of patients, estimated by some as 85 per cent, who do not require a specialist's care. The higher fees and easier professional life of the specialist strongly attract recent medical graduates, but the necessity for several years of general practice before adopting a specialty cannot be too strongly emphasized. The narrowing effect of specialism exerts

only too strong an influence on the sound judgment of the physician.

It is being argued that the dearth of general practitioners has led to the phenomenal growth of cults—the chiropractic in particular. Whether this is the case or not, efforts should be directed toward encouraging recent graduates to enter the general field. Whether this will necessitate a shorter period of medical training is open to question, for it is difficult to see just where the standard medical course of today could be abbreviated to advantage.

As a matter of fact, much apparent specialism is not real specialism. Many physicians are working gradually into a specialty and this is as it should be. Only too many of the profession are demanding the specialist's fee who are not entitled to it.

At the present time much energy is being exerted in an effort to counteract the evils of the so-called cults. It would be well if some of this energy were directed towards a house-cleaning in the ranks of the organized profession itself. Most county societies include in their membership medical men who are crooks and are recognized by their associates as such and who have no place in our ranks. The house-cleaning should go still further and extend to the unprincipled physician who is outside the county society and whose license should be revoked. Every board of medical examiners knows the difficulties to be encountered in depriving a licentiate of his right to practice and often the blame cannot be placed at the door of the medical profession. Every physician is human and makes errors and is therefore loath to point the accusing finger at his fellow practitioner. Nevertheless, a continuous warfare must be constantly maintained against the man who disgraces himself, his medical associates and the honorable profession of medicine.

The So-called Undernourished Child

The physically sub-standard child, whether called undernourished, malnourished or by some other term, appears to be difficult to define.

The popular conception among lay workers that this condition is a nutrition problem has led to their stressing the importance of food, and mothers' clubs' milk committees, etc., have sprung up everywhere, which have for their object the supplementing of home diet.

This has naturally caused medical writers, who are also thinking in terms of nutrition, to point out

that while scientific investigators have made great advances in their knowledge of food values, comparatively little is yet known, and consequently much of the enthusiastic work advocated by these milk committees may do harm.

Both of these groups, lay and professional, evidently think of this class of children as literally undernourished.

Again because of a lack of a proper definition, necessarily arbitrary standards have been set up as to what constitutes a physically sub-standard child, and the percentages of this class vary accordingly, with the result that some sincere workers criticize rather harshly others who may not use the same standards.

The standards most generally in use in this country are two, one devised by Dr. W. R. P. Emerson of Boston and the other by Thos. D. Wood of Teachers' College, New York. Both of these standards are based on weight in relation to standing height according to sex, and also consider height and weight in relation to age. There are several foreign standards, two of which have been introduced by Pirquet and Dreyer and another called the Dunfermline scale, introduced by Dr. Alister Mackenzie. In addition to the standards mentioned the U. S. Public Health Service is now making some careful studies of the physical development of school children in co-operation with the divisions of child hygiene of several state boards of health with the idea of arriving at some standard.

That there exists a considerable number of these sub-standard children cannot be questioned no matter by what name the condition is called or by what standard they are judged. It may reasonably be accepted for example that most of those rejected by the army medical examining board were at one time children of this class, and as in their case may it not be, as a recent writer says of malnutrition, "a symptom due to manifold causes operating singly or in combination."

Sir George Newman is quoted as saying:

"In endeavoring to estimate a child's nutrition or its opposite (*viz.*, malnutrition), we must think not only of bulk and weight of body, but of ratio of status to weight; of the general balance and 'substance' of the body and of its carriage and bearing; of the firmness of the tissues; of the presence of subcutaneous fat; of the condition and process of the development of the muscular system as expressed in listlessness or alertness, in apathy or keenness; of the condition of the various systems of the body, and, speaking generally, of the relative balance and co-ordination of the

functions of digestion, absorption and assimilation of food, as well as of the excretion of waste products. It is obvious that these are data which are likely to lead to a much more reliable opinion than the consideration of any one factor or ratio, however expeditiously obtained or convenient in form or practice, and these data will demand a wider as well as a more careful and accurate observation of the whole physique of the child. Nor can an ultimate opinion always be formed at one inspection at any given moment. For nutrition, like its reverse, malnutrition, is a process and not an event."

If we are to accept this conception (Newman's) of the so-called undernourished child it will be seen that not one factor, but many, play a part. Physical defects, economic conditions, health habits and environment must be considered. It is a medical problem in its broadest sense. As one pediatrician says, "The physician who sits in his office and tries to treat malnutrition by physical examination of the child alone without entering into the life and habits and environment of the child, will not get very far, nor will the nutritional worker who tries to treat malnutrition by diet without understanding the physical background."

When the lay workers realize the necessity for medical supervision of these children and, on the other hand, the doctors are aroused from their general apathy in regard to these sub-standard children, there will be no danger of this so-called nutritional work becoming a fad.

The doctors must take notice of underweight as a danger signal. If they don't, the lay workers are going to continue this work unsupervised.

Its importance is emphasized by Dr. Haven Emerson in a recent article on "The Causes of the Rapidly Increasing Fall of the Tuberculosis Death Rate in the Last Five Years." Writing of one of the accessory factors, he says:

"It is believed that the rapidly growing interest in the neglected period of childhood, the preschool, the runabout or the two to five years' age, has begun to show results in the more uniform growth and better nutrition of the children of the poor, the neglected and the ignorant, among whom in the past tuberculosis of bones, joints, lymph nodes and lungs has been common.

"No definite evidence can be offered to show that the detection, supervision and correction of undernourishment among children has been a major factor in the reduction of tuberculosis in New York, but whether among the preschool children or their older brothers and sisters, the pride in and attention to normal growth and development, and the striking change in weight and appearance of the thousands of children who have been reached by the nutritional propaganda and the supplementary school lunch system during the past ten years, must have been noted by

all interested observers. Certainly, the higher level of nutritional equilibrium, attained among children up to fifteen years of age, must have played a significant part in the diminution of deaths from tuberculosis in this age group."

Dr. Henry D. Chadwick of Westfield State Sanatorium, Westfield, Mass., after an examination of 2,828 children in which he found a large percentage of malnutrition, states:

"The evidence I have submitted only goes to confirm the belief held by many observers that antituberculosis activities should be directed more and more toward child welfare. To cover such a vast field and get thousands of tuberculous and potentially tuberculous children under supervision we should strongly advocate the adoption in every city and town of a method of group instruction and individual treatment along the lines developed by Professor Emerson in his nutrition clinics for delicate children. This can best be done in connection with the schools, as the children are there brought under official control for ten months of each year. We are neglecting our opportunities if we fail to do extensive preventive work with these children when they are in the earliest stage of disease and at a period in their lives when they will respond most quickly to rational changes in diet and habits of living. We must improve the physique and build up strong, disease-resisting bodies during childhood. Then the cases of tuberculosis, that smoulder away during adolescence only to break forth later on and decimate the ranks of young manhood and womanhood, will become fewer and fewer, and as a cause of death in the next generation this disease will become a much less important factor."

The removal of physical defects often causes the desired improvement in the child's condition. The removal of defects alone, however, is not always of such decided benefit, when other factors are neglected.

Over-fatigue and lack of rest are found to be frequent causes of these children being below par; a change in this respect, even to the extent of keeping them out of school part of the day in certain cases, is followed by marked improvement with less irritability, improved appetite and a decided change in the physical appearance. Some children are permitted to over-exercise in the hope of building up their physique, when they actually need to be kept quiet. Many have no regular hour of retiring and not infrequently stay up as late as their elders.

Among the difficulties to be overcome is to get the co-operation of parents. The parents are disinclined to believe that any special care of a child is necessary unless there is apparent disease, and, speaking generally, they are confirmed in their view by the opinion of the physician and his indifference to anything but actual disease. Doubtless,

a number of these children do pick up without special supervision; on the other hand, there are not a few others who require it.

The necessity for medical supervision of any work which attempts to aid these children is apparent. It is a health educational plan primarily. This is shown by the effect produced in some families where others than those treated benefit by example.

The best work could be done through the schools, emphasis, however, being laid on the medical aspect of all such efforts.

—W. D. B.

"Doctor" Coué

So much has been written of late about the remarkable results accomplished by Emile Coué of Nancy, France, through his "discovery" of the therapeutic value of induced auto-suggestion that an apology is almost in order for using him as editorial material. However, the reputation Coué has achieved in France, the enthusiasm with which he has been received by the ordinarily conservative English and the way his fame is spreading over this country, demand some recognition.

On commencing one of the several accounts* of Coué's ideas and practice, one is given the impression that he is being introduced to an exceptionally optimistic physician—one who has adopted little tricks such as the knotted string and the laying on of hands for the purpose of impressing the patient with optimistic ideas. We are told of the poor woman with the breast tumor who has been told by her doctor that she has cancer but is being treated by the phrase, "Day by day, in every way, I am getting better and better" because, in Dr. Coué's opinion, the case is not one of cancer. We infer that this is probably this particular physician's way of handling a case of benign cystic mastitis. And then, bang!—we learn from other sources that Coué was once an apothecary and later practiced hypnotism, but that he knows nothing of scientific medicine. He is telling this woman she is getting "better and better" and he knows nothing about the pathology of tumors.

We read further on that it doesn't matter whether the disease is organic or functional, his method applies in all diseases the flesh is heir to, and, as a

*The Practice of Auto-suggestion by the Method of Emile Coué. C. Harry Brooks. Dodd, Mead & Co., 1922.

matter of fact, that organic disease responds even more readily to auto-suggestion than do merely functional troubles.

The opportunity for doing an immeasurable amount of harm becomes at once apparent and Coué must be relegated to the ranks with Mrs. Mary Baker Eddy and other charlatans.

Whenever a so-called discovery of this sort makes its appearance, we are forced to wonder how it can be that, in this old world of ours, no one made this discovery before. If all one has to do is to think a thing in order to accomplish it and if his imagination is so much more valuable than his will-power in attaining an object, how did it happen that no one discovered this scientific truth one or two thousand years ago? And here we have all been taught that practice makes perfect and Coué says all we really need to do after all, is to think a thing in order to do it. Possibly, we are so accustomed to unexpected discoveries in the physical realm—for instance, the remarkable development of radio—that we are looking for the same in the psychic realm.

We all know physicians who have utilized optimism consciously or unconsciously either by their words or personality for the benefit of their patients. We have, on the other hand, heard of the optimistic doctor who patted his patient, with the chronic cough, on the back, telling him he was getting better and better and incidentally, either through laziness or ignorance, failed to diagnose the case as tuberculosis and spare the family from infection.

What the world is most in need of is not men of the Coué type but trained medical men of efficiency, optimism and, most of all, common sense.

nation-wide campaign of public education regarding cancer would save thousands of lives now needlessly sacrificed because of ignorance of the warning signs of the disease, and delay in seeking early competent medical advice and treatment.

The need of such a society is immediately apparent in the increase of the death rate from cancer in the United States—from 63 per 100,000 in 1900 to 83.3 per 100,000 in 1921. In the state of Minnesota the statistics of the State Board of Health show an increase in the death rate from cancer from 66.99 per 100,000 in 1910 to 90.69 per 100,000 in 1921. Unquestionably the death rate from cancer is increasing, and during the past two years has surpassed that from tuberculosis.

During the first week in November, 1921, the American Society conducted its first annual educational campaign, and has designated the week of November 12th to 18th of this year as National Cancer Week, during which time an intensive educational campaign will be conducted.

The undersigned members of the State Cancer Committee appointed by the National Society request the co-operation of the members of the medical profession in this educational campaign endorsed by the Minnesota State Medical Society, State Board of Health, State Public Health Association, and State University.

STATE CANCER COMMITTEE

V. C. Hunt (Chairman)
A. J. Chesley (State Board of Health)
A. C. Strachauer (University of Minnesota)
T. L. Chapman
A. F. Schmitt
H. P. Ritchie
H. W. Cook

The American Society for the Control of Cancer National Cancer Week—November 12-18

The American Society for the Control of Cancer was founded in New York in May, 1913, at a meeting of the delegates appointed by the principal medical societies of the United States, together with a number of prominent lay citizens who were convinced of the need of a national organization to disseminate knowledge concerning the symptoms, diagnosis, treatment and prevention of cancer, to investigate the conditions under which cancer is found, and to compile statistics in regard thereto. The founders gave expression to the belief that a

COMMUNICATIONS

To the Editor:

The following appeared in the editorial columns of the Fairmont Daily Sentinel, Friday, October 6, 1922. It is well for the profession of the state to know that there are editors who stand with us in denunciation of fraudulent medical advertising—editors that money cannot buy.

Frank Day was one of the first editors in the state to purge his columns of such advertising some ten years ago. To the writer's knowledge he has refused advertising contracts amounting to thousands of dollars in the past years.

"But our chief grievance against Senator Capper is not as a statesman and a legislator, but as a newspaper publisher and proprietor.

"Capper's Weekly,' Senator Capper's own personal organ, claims a circulation of 700,000. Senator Capper writes extensively for every issue and it is touted as 'A Champion of Human Welfare and the Square Deal.' A recent issue before us contains a lengthy article, over a facsimile of the senator's signature, in which he expresses deep concern for boys and girls, and in chaste and beautiful English gives advice which he hopes will save them from the allurements of a giddy life and impress them with the importance of studious self-denial and rectitude of conduct.

"But in the same paper containing saintly precepts and homilies on right living, what do we find?

"Column after column of the vilest, lowest, beastliest, most misleading, deceptive, dishonest and debauching advertisements of nostrums and alleged cures of diseases that are contained in any paper in the United States that is permitted to circulate through the mails.

"There isn't a publisher in Minnesota so unscrupulous and grasping as to consider for a second any one of more than fifty advertisements that disgrace Senator Capper's paper and that have defiled its columns for more than a year.

"The medicines and cure-alls that are advertised are grossly and cruelly false and delusive and have been black-listed and discredited by every reputable physician in the country.

"They appeal only to the poor and ignorant, suffering from maladies which skill and science and accredited diagnosticians are competent to deal with.

"Senator Capper is selling his name and fame to the dirty scoundrels who advertise these discredited concoctions which not only do no one a particle of good but inflict upon the victims habits and appetites that inevitably lead to ruin and disgrace.

"We declare in all earnestness that the class of advertising which the Capper paper contains should not only exclude it from the United States mails but should ostracize it and its publisher from every respectable household. Anyone who questions this statement is requested to procure a copy of the Capper paper and submit the advertisements it contains to a reputable physician.

"According to the published rates of Capper's Weekly these advertisements bring Senator Capper a handsome fortune every month. What it brings the deluded victims would hardly dovetail with the paper's motto: 'A Champion of Human Welfare.'

"This paper has no objection to Senator Capper's coming to our state to preach pure politics, but a man who is most shamefully and brazenly humbugging his innocent and confiding patrons is not entitled to the respect and consideration of honest voters."

R. C. HUNT,
Fairmont, Minn.

OBITUARY

JOHN D. ANDERSON

Dr. John D. Anderson, one of the most widely known general medical practitioners in Minneapolis, died September 30, 1922, at Eitel Hospital, a few hours after suffering a cerebral hemorrhage. Dr. Anderson was 67 years old.

Dr. Anderson was born June 29, 1855, in Victoria county, Ontario, and was a graduate of Toronto University. In 1879 he went to Edinburgh, Scotland, where he took a post-graduate course, winning a gold medal for his work. He received other honors from London University and the Royal College of Physicians.

Dr. Anderson came to Minneapolis in 1882 and opened his offices for practice in the Syndicate block, of which he was the first tenant.

Dr. Anderson was a member of the British Medical Association, the Hennepin County Medical Society, the Minnesota State Medical Association, the Elks and the Minneapolis Athletic Club. He is survived by his wife and two daughters, Mary and Jean Anderson.

ORAN S. PINE

Dr. Oran Steadman Pine, Civil war veteran and for many years surgeon at the Minnesota Soldiers' home and later assistant city physician of St. Paul, died as a result of heart disease at the St. Paul City Hospital, October 2, 1922, at the age of 77 years.

Dr. Pine was born at Underhill, Vermont, in 1845. He served in the Civil war with the Fifth regiment, New York volunteers. At the battle of Cold Harbor he was taken prisoner and confined in Libby prison. Later, when he was being taken to Andersonville prison, he escaped.

Following the war, Dr. Pine studied medicine at Bellevue College in New York and was graduated in 1870. He came to St. Paul in 1888 and married Dr. Alcinda Auten. He was a member of the American Medical Association.

Dr. Pine is survived by his wife, two daughters, Mrs. Fidelia Auten Taylor of Table Grove, Ill., Miss Esther Pine of St. Paul; a niece, Mrs. Herbert Bolstad of St. Paul; a brother, Elmer Pine of Montpelier, Vt.; and a sister, Mrs. Eleanor Osgood of Grand Isle, Vt.

HENRY C. ALDRICH

Dr. Henry C. Aldrich, aged 65, a physician in Minneapolis for more than 30 years, died September 29 in Santa Monica, California, where he had resided for the past year.

Dr. Aldrich was born in Minneapolis in 1857, the son of Mr. and Mrs. Cyrus Aldrich. He graduated from the University of Pennsylvania in 1879 and from Hahnemann Medical College in Philadelphia in 1881. He was clinical professor in women's diseases at the University of Minnesota for several years and later was registrar of the American Institute of Homeopathy. He was formerly president of the American Association of Official Surgeons, Minnesota State Institute of Homeopathy and Minneapolis Homeopathic Society and was surgeon of the Minneapolis City Hospital from 1897 to 1905.

Dr. Aldrich is survived by his wife and son, Henry, who were with him in California at the time of his death.

Dr. Frank W. Anderson, a member of the permanent staff of the Mayo Clinic, Rochester, died September 29, 1922, at his home in Roslindale, Massachusetts.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

NICOLLET-LESUEUR COUNTY MEDICAL SOCIETY

The semi-annual meeting of the Nicollet-LeSueur County Medical Society was held at the State Hospital at St. Peter, Tuesday evening, October 3, with an attendance of nineteen members. Following the business meeting, Dr. George T. Baskett contributed a paper on "State Institutions." Preceding the meeting, the hospital doctors entertained members of the society at a banquet.

MINNESOTA STATE MEDICAL ASSOCIATION

The fifty-fourth annual meeting of the Minnesota State Medical Association was held on the University campus, Minneapolis, October 12, 13 and 14, 1922. The registration was 409 of a total membership of 1,815. The addresses were furnished by the association members and the program was a full one.

Professor A. J. Carlson of the University of Chicago addressed the members at the annual banquet held at the Curtis Hotel, Minneapolis, and spoke on "Recent Advances in the Physiology of the Alimentary Tract."

The following officers were elected for the year 1923: President, E. Starr Judd, Rochester; first vice president, Theodore Bratrud, Warren; second vice president, H. P. Ritchie, St. Paul; third vice president, J. C. Metzger, Olivia; secretary, Carl B. Drake, St. Paul; treasurer, F. L. Beckley, St. Paul. J. G. Millspaugh, Little Falls, W. A. Dennis, St. Paul, and H. M. Workman, Tracy, were re-elected to act as councilors from the second, third and fifth districts respectively. Dr. J. L. Rothrock of St. Paul was elected delegate to the annual meeting of the American Medical Association, with Dr. J. F. Corbett of Minneapolis as alternate.

It was decided to hold the next annual meeting of the association in St. Paul in October, 1923.

MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE RAILWAY SURGICAL ASSOCIATION

The fifteenth annual meeting of the Minneapolis, St. Paul & Sault Ste. Marie Railway Surgical Association was held September 25 and 26, 1922, at the Leland Hotel, Minot, North Dakota.

Morning and afternoon sessions, Monday, September 25, were devoted to the reading and discussion of papers. At a banquet held in the Leland Hotel, Monday evening, Dr. Arthur N. Collins of Duluth delivered the president's address followed by addresses given by Austin E. Wallace, Minneapolis, general manager of the Soo Railway, and Hon. R. A. Nestos, Governor of North Dakota.

The business session held Tuesday morning resulted in the election of the following officers for the ensuing year: President, Dr. John V. R. Lyman, Eau Claire, Wisconsin; vice president, Dr. Alfred M. Ridgway, Annandale, Minnesota; secretary-treasurer, Dr. John H. Rishmiller, Minneapolis.

The 1923 annual meeting will be held in Minneapolis, the time of the meeting to be left to the discretion of the officers.

ST. PAUL CLINIC WEEK

St. Paul Clinic Week will be held this year from January 9 to 12, 1923, inclusive. Morning sessions will be devoted to clinical work with a symposium each afternoon. The daily sessions will be addressed by visiting physicians.

RED RIVER VALLEY MEDICAL SOCIETY

The Red River Valley Medical Society held its regular annual meeting at the Oakland Park Sanatorium, Thief River Falls, Thursday, September 14, 1922.

The following program was given: Clinics on Pulmonary and Laryngeal Tuberculosis, Dr. M. Geo. Milan, Thief River Falls; "Classification of the Pulmonary Tuberculous Individual," Dr. M. Geo. Milan, Thief River Falls, Minn.; "The Uses and Limitations of the X-Ray in the Diagnosis of Pulmonary Tuberculosis," Dr. O. N. Meland, Warren, Minn.; "The Value of Rest in the Treatment of Pulmonary Tuberculosis," Dr. F. F. Callahan, Pokegama, Minn.; "Surgical Tuberculosis," Dr. Emil S. Geist, Minneapolis, Minn.; "The State Campaign Against Tuberculosis: Its Accomplishments and Its Future," Dr. Robinson Bosworth, St. Paul, Minn.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES—WRIGHT COUNTY MEDICAL SOCIETY

The annual meeting of the Wright County Medical Society was held Tuesday, October 3, at Buffalo. The program included the following papers:

Irregularities of the Heart—Dr. T. A. Peppard, Minneapolis.

Chronic Valvular Disease of the Heart—Dr. L. Harrison, Howard Lake.

Pericarditis—Dr. C. L. Roholt, Waverly.

Myocarditis—Dr. A. M. Ridgway, Annandale.

The following officers were elected for the ensuing year: President, Dr. E. E. Shrader, Watertown; vice president, Dr. A. G. Moffatt, Howard Lake; secretary-treasurer, Dr. J. J. Catlin, Buffalo; delegate, Dr. L. Harriman, Howard Lake; alternate, Dr. V. Roseau, Maple Lake; censor, Dr. J. J. Catlin, Buffalo.

Following the meeting, members of the society and their wives were entertained at a banquet and social evening.

MINNESOTA PATHOLOGICAL SOCIETY

At a meeting of the Minnesota Pathological Society, held Tuesday evening, October 17, at the Institute of Anatomy, University campus, Minneapolis, the following papers were presented: Ovarian Tumors and Their Clinical Significance, Dr. W. C. MacCarty, Rochester; Periarthritis Nodosa, Dr. W. A. O'Brien, Minneapolis; Teratoma of Ovary, Dr. Margaret Warwick, St. Paul; Accessory Breast, Dr. J. Warren Bell, Minneapolis.

OF GENERAL INTEREST

Dr. Ross Gamble is now engaged in practice at Ellendale, Minnesota.

Dr. Howard L. Sargeant, formerly of Dalton, is now located at Rochester.

Dr. H. C. Anderson of St. Paul is now engaged in practice at Little Fork, Minnesota.

Dr. Robert Emmett Farr read a paper before the Surgical Society of Portland, Me., October 27.

Dr. G. C. Hoff, formerly practicing at Tower City, North Dakota, has located at Elgin, Minnesota.

Dr. H. J. Kooiker, formerly of Doon, Iowa, is now engaged in the practice of medicine at Hills, Minnesota.

Dr. Fredolph H. Magney of Duluth and Miss Ruth Taylor, also of Duluth, were married August 15, 1922.

Miss Ida Ann French of Minneapolis and Dr. Oswald Wyatt were married in Minneapolis, September 16.

The new 89-room addition to St. Mary's Hospital, Duluth, was completed and opened to patients in September.

Dr. M. H. Tibbetts of Duluth has recently returned from a two weeks' canoe trip in the National Superior Forest.

Dr. C. W. Lynde, who has been engaged in practice at New London for the past year, has moved his practice to Chokio.

Dr. A. A. Rankin has removed from Zumbro Falls to Waconia, Minnesota, where he practiced formerly from 1904 to 1911.

Dr. M. L. Golberg has recently changed his residence from Jasper, Minnesota, to 1535 East Thirty-second Street, Minneapolis.

Dr. William J. Eklund has been elected president of the Duluth National Bank to succeed his father, the late Dr. J. J. Eklund.

Dr. R. W. Nichols, who received his graduate degrees from the Mayo Foundation October 2, will practice in New Haven, Conn.

Dr. L. W. Satterlee, formerly of Parkers Prairie, has located in Pequot, where he has taken over the practice of the late Dr. Knights.

Dr. A. J. Goodwin received graduate degrees from the Mayo Foundation, October 2. Dr. Goodwin will practice in Wheeling, West Virginia.

Dr. and Mrs. Donald Rockwell announce the arrival of a daughter, Mary Ethel, born September 27 at St. Mary's Hospital, Rochester, Minn.

Dr. George M. McCreight of Des Moines, Iowa, formerly of Albert Lea, has announced his marriage to Miss Maurine McTherrin of Des Moines.

Dr. C. W. More of Eveleth has returned from a trip east, where he attended the meeting of the National Hospital Association at Atlantic City.

Dr. A. L. Lockwood, formerly of the Mayo Clinic, has announced the opening of the Lockwood Clinic at 164 East Bloor Street, Toronto, Ontario.

Dr. F. S. Chambers, first assistant in orthopedic surgery at the Mayo Clinic, left October 3 for Trenton, New Jersey, where he will practice orthopedic surgery.

An effort is being made by the St. Louis County Medical Society to educate the public through the public schools of Duluth in the matter of goiter prevention.

Dr. M. G. Peterman, formerly chief resident physician of the City and County Hospital, has accepted a position at the Mayo Clinic, in the department of surgery.

Dr. V. P. Blair of St. Louis visited the Mayo Clinic at Rochester, September 27 and 28. Dr. Blair is Professor of Oral and Plastic Surgery in the Washington University.

Dr. W. J. Kucera has announced the removal of his offices to 329 Hennepin Avenue, Minneapolis, where he is specializing in diseases of the eye, ear, nose and throat.

Dr. H. O. Ruud of Alexandria has sold his practice to Dr. E. Tanquist of Minneapolis, and will take a special course in eye, ear, nose and throat at the state university.

Word has been received of the marriage of Dr. John A. Saari, formerly of Eveleth, Minn., now of Portland, Oregon, to Miss Frances Cook of Terre Haute, Indiana, September 7.

Dr. G. R. Moloney, Belle Plaine, recently returned from a two and one-half months' visit to Ireland. He says that things have changed for the better since his emigration fifty years ago.

Dr. H. H. Bowling, of the Mayo Clinic, Rochester, attended the meeting of the Milwaukee Surgical Society, October 2, and read a paper on radium and roentgen rays in surgery.

Dr. S. Brock, having received his graduate degree in surgery at the Mayo Clinic, Rochester, left the Clinic, October 1. He will be associated with Drs. Storer and Kegel of Chicago.

Dr. J. O. McKeon of Montgomery, who recently underwent an operation at Abbott Hospital, Minneapolis, is now able to take care of his practice again after an absence of several weeks.

A pretty fall wedding was that of Dr. Harold Nesbit of Rochester and Miss Dorothy Tennant of Wabasha, which took place at the home of the bride's parents in Wabasha, September 15.

Dr. and Mrs. O. J. Seifert of New Ulm have sailed for Europe, where Dr. Seifert will spend six months in study. Dr. J. H. Vogel will have charge of Dr. Seifert's practice in his absence.

Dr. R. H. Sweetman, formerly of Menahga, has located in Sauk Center, where he has opened a ten-bed hospital. Dr. Sweetman will engage in general practice, with special attention to surgery.

Dr. Albert H. Aland, who was formerly located in St. Paul, has become associated with Drs. Farr and Maxeiner in the Surgical Clinic of Minneapolis in the Eye, Ear, Nose and Throat Department.

Dr. E. W. Hayes, formerly of Tucson, Arizona, and Banning, California, is now associated with Drs. Kalb, Kirschner, Putnam and Gleeten, who have formed the Monrovia Tuberculosis Clinic, California.

Dr. J. C. Wilkinson sold his practice at Red Lake Falls last month to Dr. J. A. Roy of Argyle. Dr. Wilkinson and family are now making their home at Donna, Texas, where the doctor has extensive land interests.

Dr. J. H. Kauffman, who has been practicing at Elgin for the past three months, has returned to his former location at Currie, where he has bought an interest in a drug store in addition to taking over his former practice.

Dr. Edwin O. Swanson of St. Paul and Miss May Ludke of Amery, Wisconsin, were married in St. Paul September 14. Dr. and Mrs. Swanson are now at home in St. Paul, following a trip through northern Minnesota.

Dr. and Mrs. Soren P. Rees of Minneapolis have returned from a motor trip through the New England states. They were accompanied by their son, Douglas Rees, who is a senior at Wesleyan University, Middletown, Conn.

Dr. O. E. Hagen of Butterfield has associated with him in his practice, Dr. Rempel, who recently came from Russia. Dr. Rempel is a graduate of a Russian medical college, having a seven years' course with a year of clinical work.

Announcement has been received of the marriage of Dr. William Andrew Lee of Fergus Falls and Miss Lucille L. Moses of Mankato, which occurred September 7. Dr. and Mrs. Lee are now at home at 336 North Whitford Street, Fergus Falls.

Dr. H. E. Robertson of the Mayo Clinic, Rochester, represented the seventh corps area of reserve officers in Washington, D. C., early in October. The meeting was called for the purpose of organizing a national association of reserve officers.

Dr. D. W. McDougald has disposed of his practice and equipment at Le Sueur and left, September 16, for New York, where he intends to take postgraduate work in eye, ear, nose and throat, after which he will return to the Northwest to practice his specialty. Dr. S. Ericson, formerly of Elnore, is now located at Le Sueur.

Drs. C. A. Hedblom and W. S. Lemon of the Mayo Clinic, Rochester, attended the meeting of the Trudeau Society at Grand Rapids, Mich., and another medical society meeting at Battle Creek, Mich. Dr. Hedblom read a paper on recent progress in thoracic surgery, and Dr. Lemon read one on the incidence of tuberculosis and Hodgkin's disease before both meetings.

The American Medical Association of Vienna wishes the announcement made of the restoration of friendly understandings between their organization and the teaching body of the University of Vienna. Announcements have been made elsewhere of some friction occurring between some of the visiting American doctors and the Vienna faculty, but this occurred in connection with courses not under the control of the American Medical Association of Vienna. Courses in English are now booked in the various branches of medicine and surgery and prices range from \$3.00 to \$5.00 an hour for the group taking such courses.

Dr. Harvey Cushing, '91, of Harvard University, has won the Charles Mickle Fellowship from the Faculty of Medicine of Toronto University. He has accepted the fellowship, which is for \$1,000, but has stipulated that the money shall be used to send one graduate of the University of Toronto to Harvard to work with him. The Charles Mickle Fellowship, bequeathed by the late Dr. W. J. Mickle, is the annual income from an endowment of \$25,000 and is awarded annually to the member of the medical profession anywhere who is considered to have done the most during the pre-

ceding ten years to advance sound knowledge of a practical kind in medicine.

At a meeting held in Millard Hall, University campus, Minneapolis, October 13, the wives of members of the Minnesota State Medical Association organized a Women's Auxiliary to the association. The following officers were elected to serve for the ensuing year: President, Mrs. H. B. Sweetser, Minneapolis; first vice-president, Mrs. H. P. Ritchie, St. Paul; second vice-president, Mrs. K. E. Bergquist, Duluth; third vice-president, Mrs. F. C. Rodda, Minneapolis; recording secretary, Mrs. Rood Taylor, Minneapolis; corresponding secretary, Mrs. Carl B. Drake, St. Paul; treasurer, Mrs. E. Z. Wanous, Minneapolis. A fourth vice-president is to be elected from some district outside the cities of Minneapolis, St. Paul and Duluth. It was also decided that the president should appoint a publicity secretary and a constitution committee.

The annual luncheon and meeting of the Medical Alumni of the University of Minnesota was held Saturday, October 14, at the Men's Union building on the University campus. The following officers were elected for the ensuing year: President, Dr. E. L. Gardner, Minneapolis; first vice president, Dr. George B. Eusterman, Rochester; second vice president, Dr. T. L. Martin, Duluth. Dr. Donald Daniel was re-elected secretary-treasurer and Dr. George Douglas Head was elected as representative on the general alumni committee. Dr. J. W. George of Minneapolis gave the obituary report and called attention to the fact that six of the twelve deaths reported during the year were violent. He called attention to the desirability of extending the field of Preventive Medicine to include the prevention of accidents such as the railroad grade crossing. Two days later, Dr. George met with an automobile accident and later in the day died as he was driving his car, death being due to heart disease.

BOOK REVIEWS

BOOKS RECEIVED FOR REVIEW

A MANUAL OF PHARMACOLOGY AND ITS APPLICATIONS TO THERAPEUTICS AND TOXICOLOGY. Torald Sollman, M.D., Professor of Pharmacology and Materia Medica in the School of Medicine, Western Reserve University, Cleveland. Second edition, Octavo of 1066 pages. Philadelphia and London: W. B. Saunders Company, 1922. Cloth, \$7.00 net.

LECTURES ON DIETETICS. Max Einhorn, M.D., Emeritus Professor of Medicine at the New York Post-Graduate Medical School and Hospital, New York. 12mo of 244 pages. Philadelphia and London: W. B. Saunders Company, 1922. Cloth, \$2.25 net.

LOCATIONS

There is an opening for a physician at McGrath, Minn., where the vicinity is without a doctor within 20 miles. A new building is being erected by the community for use as office and living rooms for a resident physician. Address Frank Klingl, McGrath, Minn.

Zumbro Falls, Minn., has been without a physician since October 1, 1922. Good opening.

MINNESOTA MEDICINE

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ORIGINAL ARTICLES

THE NEED OF A PSYCHOPATHIC HOSPITAL AT THE UNIVERSITY OF MINNESOTA*

ARTHUR S. HAMILTON, M.D.
Minneapolis, Minn.

For some years the project of a psychopathic hospital to be located at the University has been under discussion. The idea has aroused considerable interest and much favorable comment, but so far there have been no practical results and my object in presenting a paper at this time on the need of a psychopathic hospital at the University is to attempt to arouse a greater interest and develop a stronger support from the medical profession when the project is brought up at the next meeting of the State Legislature.

Since my experience in the practice of medicine during a number of years has not led me to anticipate in the average physician a very great interest in the problem of mental health, I trust you will pardon me if, at the outset, I present some rather elemental facts dealing with the situation.

The problem of mental disease is one of extraordinary importance and is extremely far-reaching. If it referred only to those whom the law chooses to call insane, it would still constitute the largest single financial drain on the resources of the state; but, as a matter of fact, mental disease has a much wider significance than insanity, which is in no sense a medical term but one forced on us by the law. Naturally all who are insane are mentally diseased, but in every locality there are many who are mentally diseased who could not and ought not to be classed as insane in a court of law and who, throughout their lives, are rendered more or less inefficient and more or less unhappy by their pathological mental condition. Besides all these we have the group of epileptics and feeble-minded, whose care is becoming a constantly greater burden and for whom the state makes continually increasing provisions. Among criminals a large pro-

portion are mentally defective and many would ultimately fall under the care of the state for other reasons if they had not previously been apprehended as criminals. Finally, that a considerable percentage of our prostitutes are really defective mentally is generally known.

To make these general statements, however, does not suffice, for they have been made often enough in the past and I wish to present some additional and more concrete evidence.

On January 1, 1920, there were 250,000 individuals in this country in institutions for the care of those mentally diseased—almost or quite as many as there are students in all our colleges and universities. How many more are confined in almshouses, prisons and reformatories or are cared for in their own homes, no one knows. The census of 1920 showed an increase in the general population over 1880 of 110.8 per cent. In the same period the number of patients cared for in state institutions for those mentally diseased had increased 468.3 per cent, an increase more than four times as rapid as the general population. Last year there were committed to the institutions for the insane and feeble-minded in Minnesota 1,847 cases. In the next ten years an army of 18,470 will have entered these institutions and a number not much smaller will have been cared for in private homes.

If it adds anything to the seriousness of the situation, let it be known that the expense of caring for the insane and feeble-minded in the institutions of Minnesota was \$2,305,163.18 last year.

Besides all these, 500,000 men, women and children go into the prisons, jails and reformatories of the United States every year and many of them are more or less mentally defective. And the worst aspect of it all is that each year, less those that have died, a like number of more or less reformed criminals is turned back into the country, all too often to propagate their kind.

In the late army draft 72,000 men were rejected on account of mental and nervous conditions and no one who deals with the present group under federal care will doubt that the number should have been much larger.

*Presented before the Minnesota State Medical Association, Minneapolis, October, 1922.

If, in these statistics, I have presented a fair picture of how tremendous a social and financial problem our country faces, one may next inquire, "Why has it received so little attention from the standpoint of public health or preventive medicine, or of even ordinary treatment?" At this very moment when so much time, money and individual effort is devoted to public health problems in general, the study of diseases of the mind is left almost wholly to a small group of specialists who meet with little support from the public or the profession. If a man is sick or injured in his body the public has provided for him, everywhere, well qualified physicians to whom he can go for advice, and hospitals and dispensaries if he needs institutional care. If he is ill in his mind he has not been educated to consult his medical advisor and, if he does go, his advice is very likely to come from one whose knowledge of mental diseases is derived from a few didactic lectures with little or no clinical training. If he needs institutional care it is denied him in practically every general hospital and, if admitted by accident, he is ejected at the earliest possible opportunity. His only recourse then is the state hospital, to which he rarely resorts voluntarily in the incipient and most hopeful stage of his illness. In justice to himself and the public as well, he should possess the same right of treatment and the same hospital care as is accorded to those ill with any other disease. This means that in any city of sufficient size, say 100,000, to support a good general hospital, there should be wards especially planned for the reception of patients suffering from mental disease, an integral part of a general hospital, but under the care of specially trained psychiatrists. Under such an arrangement, not only will the relatives and friends be more willing to submit the patient to hospital care, but when once admitted the patient will find himself in a general hospital atmosphere, in an institution for the care of sick people and, perhaps most important of all, in an institution where he may receive skilled treatment in all the different special phases of medicine.

To secure for the insane some such provision as I have outlined, two things are specially necessary: (1) a better training of medical students in clinical psychiatry, and (2) a diffusion among the laity of such facts as are actually available concerning mental disease so that the public may come to recognize the insane man as a sick man suffering

from an illness which has understandable causes, is preventable in many instances and curable in quite as large a percentage of cases as the grave somatic diseases.

To fulfill the first of these conditions, namely, a better training of medical students in clinical psychiatry, is absolutely impossible, at this time, at least so far as the University of Minnesota is concerned. For years we have been sending out men who constitute a very large proportion of the physicians of this state and who are absolutely unqualified to render the best service in the great group of mental diseases. Every one who has anything to do with the teaching of medicine knows that you cannot teach clinical medicine from a book. The student must see the individuals who are afflicted with the particular condition being studied and, by and by, with such personal contact, the student ultimately acquires a certain degree of skill. At the present time our students have no opportunity for such personal contact. Partly because insanity is still looked upon as a more or less mysterious thing, the offsprings of jails, prisons and courts of law, rather than the child of medicine, and partly because the patients do not fit well into the general hospital regime, there is no provision made for them in the University Hospital, and even in our municipal hospitals there is only a limited amount of clinical material available. We hope to remedy this defect when a psychopathic institution is added to the hospital equipment of the University of Minnesota. If we can turn out medical men properly qualified to give such advice as is possible concerning mental hygiene and to render the best service to cases of mental disease, we shall have rendered a real service to the state.

We also hope to turn out a class of nurses well qualified to deal with mental conditions. At the present time it is possible to find many nurses in Minnesota who have abundant experience in dealing with mental disease, but who lack adequate training in general hospital methods. On the other hand, the state is well supplied with nurses who have had excellent general hospital training, but who know practically nothing and who, as a rule, care nothing about mental cases. From this psychopathic hospital we expect to graduate nurses who are well qualified in both respects.

An essential part of every well equipped psychopathic hospital is a well established out-patient service and at this time no adequate service of this

kind exists at the University of Minnesota. We lack the personnel and the physical equipment to properly care for the mental cases even in our immediate community. Certainly we can do nothing outside.

In connection with this institution we hope to develop an active out-patient or dispensary service through which incipient mental conditions can early be detected and treated and, some of them, at least, be saved from later becoming an expense to the state. We expect also, if this out-patient service develops, to perform a similar function in other parts of the state through trained workers from the psychopathic hospital.

A psychopathic hospital will also be of assistance to the courts of the state in caring for defective and delinquent individuals. Under regulations provided for in the bill as drawn, the courts may use the psychopathic hospital for detention purposes and for the proper study of mental defectives. This work has been carried on widely elsewhere and I believe the courts recognize it as a very valuable service.

We expect to establish also a laboratory in this institution where original work will be carried on—not only work for patients directly in our psychopathic hospital but also for institutions of more or less similar purpose all over the state. By original investigation we hope to contribute something toward the solution of the causes of the different types of mental abnormality, and we expect also to develop a corps of investigators who will be adequate for service wherever needed in any of our state institutions.

When the psychopathic hospital has been established as a division of the University Hospital we shall have available for the treatment of the individuals under care, specialists from the different departments of medicine, such as internal medicine, surgery, gynecology, ophthalmology and otology, and pediatrics, and thus have at command a body of experts who are able to offer the best service in every field in which the patients in the psychopathic hospital may be assumed to need attention.

The peculiar attitude of people at large regarding mental diseases has been referred to. Though scientific and humanitarian ideas prevail more or less in the care of the insane and the mental defective, we are still not altogether free from the superstitions of the past, and to many individuals in-

sanity still remains a mysterious thing, something peculiar, something apart from our ordinary experiences, and this applies in only a slightly less degree to what we think of as nervous diseases as against mental diseases. I venture to say that the vast majority of people who consult a physician for some nervous condition will be met with such an expression as this: "It is only a nervous condition." That word "only" is the weak point in the statement because it gives the idea to the patient that he is suffering from something which he could avoid if he would, something which he has more or less voluntarily put on. In other words, it requires the nervous patient to assume at the onset an apologetic attitude toward himself when his inferiority complex is already overemphasized. Of course the attitude of the world toward nervous and mental conditions has changed greatly in past years and is still advancing toward a better level; yet there remains much to be done and the attitude of the public toward all nervous and mental conditions is by no means satisfactory. A psychopathic hospital, by educating the public mind concerning the importance and nature of mental diseases, the methods by which they can be prevented and the most efficient means of cure, will be the greatest single factor in promoting the aims of mental hygiene in this or any other community. In the campaign to secure a psychopathic hospital we have had the earnest support of the State Board of Control and of the Institution authorities of Minnesota and, if we can rely upon the practitioners of medicine of the state for equally enthusiastic support, I believe we shall be successful in securing the necessary appropriation from the next legislature.

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DISCUSSION

DR. W. A. JONES, Minneapolis: Not much can be added to what Dr. Hamilton has already said, except that this psychopathic hospital, if it is to be established, will be started on a small basis. It is very difficult to conceive of a legislative body giving sufficient financial support to a hospital of adequate size, consequently I believe most of the patients that are received in the psychopathic hospital should be those who are acutely and mentally sick. When I say mentally sick I mean they are sick from some physical or other cause which may be discerned by observation and by examination. Most of us are too slow in appreciating the mental attitude of people. We make very fine diagnoses, perhaps, from a physical point of view, but we forget the individual, the family traits, his and their methods of thinking, the manner in which he and they express themselves, etc. Is it because his father, mother, or grandfather prompted the tendency in him to think in the wrong direction? Most of those people who become disturbed mentally, and who should be in a psychopathic hospital, are more or less physically or mentally deficient, and these people should be carefully weeded out and classified.

Those who have the opportunity in private hospitals to study mental cases know very well that a large proportion of them can be restored to perfect health, physically first and mentally afterward, provided you can have absolute control of the individual, and further, and more important, the control of the individual's family. These people should be, if possible, entirely eliminated from any suggestion or care of the mentally sick. I think that the proper way is to have a definite understanding with them, and not do as we do in our general hospital or university hospital, permit the families of patients, the friends of patients, to come in and "cheer them up." I am sorry to say, a lot of other people should be excluded from their presence, and in many instances the family minister should not be allowed. This is because people are commonly depressed, and anything that reminds them of their state of mind means further depression and a further fixed idea that they are not going to recover.

I recall the instance of a woman who lost her husband and son within a few weeks. She was naturally grief-stricken, but she became morbidly depressed, was sent to a sanitarium and remained there three months without any improvement. The doctor in charge was confident that nothing could be done and referred her to her family. She was brought home by a friend who kept her for observation four or five weeks before she decided the woman was insane. No one had talked to her about the condition of her mind. They seemed to be afraid to do so; and when the doctor in charge saw her he bluntly said, "Are you afraid you are going crazy?" She replied, "Yes." The doctor told her he had never heard of a red-headed woman going crazy. She improved at once, recovered promptly, married another man, and had a family. (Laughter.)

How are you going to accomplish this psychopathic hospital? Dr. Corbett has told you about the organization of county societies and district associations in connection with the State Association; and if you get every doctor in this state to tell his representative that a psychopathic hospital is needed, you may get it, but you cannot get it without the support of the entire medical profession. This was done

in Colorado, wonderfully done, but it took them two or three years to do it. They wrote to every doctor; they sent him a questionnaire and secured his signature to support the proposition of establishing a hospital, and it was done. The legislature were overwhelmed with requests, and they promptly gave them \$350,000.00. The hospital is now under construction and will shortly be opened for use.

Again, the doctor has to go into politics. He has to go into the right kind of politics, medical politics, that which is good for the people, and that which the doctor stands behind. Unless you do that, and if you confine your discussions to your associates only, paying no attention to the public need, medical politics amounts to nothing.

Look at some of our competitors that are representing societies. They are right on the job. They have a good organization; they are going to keep it up until they accomplish what they want, and we should do the same thing. We will fail miserably if we do not, and it will be a long time before the legislature sees fit to give a sufficient appropriation for the beginning and establishment of a psychopathic hospital.

The principal points are a study of the individual not only physically but mentally, a study of the family from the same point of view, and an honest investigation of their attitude of mind. Do not be afraid to talk to a man who is insane and tell him so. You do not have to tell him he is insane; tell him he is crazy. He likes to have you understand his mental attitude, and then you can do more with him.

The various types of cases which are to be admitted into the psychopathic hospital will have to be determined later. I do not approve of the suggestion that the defective, the imbecile, the criminal, and such types of people be given precedence in this matter. They should take third or fourth place, after the admission of those who are physically and mentally sick. The latter should have the first opportunity for observation and treatment. One of the first things for you to do on the twenty-eighth of October of this year is to register. There are a lot of doctors in this room who have not registered, but should do so, and vote on the seventh of November. Perhaps if you vote for the right men you may get appropriations for this hospital.

DR. GEORGE D. HEAD, Minneapolis: It seems to me, as I sat here and heard the excellent address of Dr. Hamilton, that it ought not to be confined entirely in its scope to the profession of the state, and I am a firm believer in educational methods of dealing with many of these political questions. Therefore, I would move that this address be sent, at the expense of the Minnesota State Medical Association, to every legislator who is to be a member of either the Upper or Lower House in this state so soon as the fall elections have taken place and the men are known.

DR. ARTHUR S. HAMILTON, Minneapolis (closing): I wish to thank you for the kind reception of my paper and for the action you have taken. Lest there be left in your minds any idea that we are competing with the state hospitals, let me add that we are asking for a hospital of only seventy-five beds, whereas there are 8,441 individuals actually under care this day in the six state institutions of Minnesota for the care of the insane. All we desire is a small teaching hospital for the care of acute cases.

SURGERY OF ACUTE CONDITIONS OF THE GALLBLADDER*

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and

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The earliest conception of disease of the gallbladder was that the formation of calculi in the gallbladder or bile ducts was the chief and only consideration. Later it was realized that the formation of stones was secondary to an infection which had invaded the tissues at some point in the excretory apparatus of the liver, usually in the gallbladder. In the light of the much broader experience of the last few years it can now be said that in most of these cases infection which is so evident in the gallbladder is a part of a much more general infection which often involves the liver and pancreas as well as the gallbladder and ducts.

It has been clearly shown that the anatomic arrangement of the lymphatics in these tissues is such that it would be almost impossible for infection to exist in one and not extend to the other. It has recently been demonstrated by Graham that infection may enter by way of the portal circulation and invade the liver first, so that in certain cases the hepatitis may be primary, and the cholecystitis secondary. This theory of the mode of extension of the infection may or may not become generally accepted; but in any event we shall probably continue to regard the gallbladder as the chief offender and the organ in which the infection is retained.

In the cases in which the infection is very acute and the gallbladder contains stones and pus, the wall of the gallbladder is usually greatly thickened. In these cases, it is difficult to explain how an infection so severe can occur with so few and often mild clinical manifestations, and, on the other hand, why a patient with an apparently mild infection may have severe symptoms. In the most severely infected gallbladder the disease seems to be rather definitely confined, whereas in less severe cholecystitis, there is often more evidence of change in the hepatic and pancreatic tissues. Chills and fever and other signs of a more general infection

are not common in empyema of the gallbladder unless the empyema is accompanied by stones and infection in the ducts. This is rather difficult to explain in view of the easy extension of infection from the gallbladder to the liver through the rich network of lymphatic vessels. Abscesses in the liver very rarely occur in association with suppuration in the gallbladder except when there is perforation from the gallbladder into the tissue of the liver. Small multiple abscesses, such as occur secondary to suppurating appendicitis, are almost unknown. In certain cases the infection in the liver is very pronounced, the liver is swollen, edematous and often greatly enlarged, and microscopically shows severe hepatitis. In such cases, the evidence of cholecystitis may be comparatively slight. Such a marked hepatitis with only mild cholecystitis may indicate that the disease was primarily hepatitis.

In the cases in which there is pus in the gallbladder or in which the gallbladder has become gangrenous, it is unusual to find much infection in the pancreas. If the pancreas is involved it occurs in one of two ways.

In the first type of pancreatitis the pancreas may be generally enlarged and harder than normal, with a distinctly lobulated and roughened surface. The head of the gland will generally show the greatest change. In these cases there seem to be no special symptoms referable to changes in the pancreas and often the condition is overlooked. It may occur in association with any degree of cholecystitis. Evidence to support this is the number of cysts found in the pancreas in cases in which there are no clinical or pathologic signs of cholecystitis. More than half of our cases of pancreatic cyst apparently occurred independent of cholecystitis. However, when this form of pancreatitis does occur with a cholecystitis, I believe that it is a true inflammation and that the changes in the pancreas are caused by an extension of the infection to the pancreatic tissue by way of the lymphatics.

The second type of pancreatitis is often spoken of as pancreatic necrosis. The clinical manifestations are pronounced. The pain is in the same location as in most cases of cholecystitis, but it is continuous, very much more severe and often uncontrollable by palliative measures, and usually persists until relief is afforded by treatment, or it terminates fatally, as is often the case. Such severe and protracted epigastric pain in cases of supposed cholecystitis always suggests pancreatitis, which

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often accompanies what appears to be a mild cholecystitis. The gallbladder is usually somewhat thickened and reddened, and in most instances contains stones. Free fluid which may contain blood is found in the peritoneal cavity. The characteristic change is the fat necrosis which occurs, especially in the omentum, although it may occur in the other tissues. This change is apparently due to pancreatic ferments and not to bacteria. The pancreas is greatly swollen and edematous, and if the capsule has not already ruptured, it is very tense. The necrosis in the pancreas may involve almost the entire gland, in which event the outcome will be fatal. Even with less involvement, particles of necrotic tissue will be present in the peritoneal fluid, but in such a case, after long drainage, the patient may recover completely.

Extensive experimental work has been carried out in order to determine the etiology of pancreatitis, but many questions still remain unsolved. Jones suggests that in the first type, in which there is more or less chronic inflammation, the infection enters the pancreas by way of the lymphatics, thus causing the general lymphatic infection throughout the pancreas, but not resulting in fat necrosis. When fat necrosis does occur, he believes that the etiologic factor is the entrance of bile into the pancreatic duct. The circumstances under which bile entering the pancreatic duct will produce these changes have not yet been proved. It has been demonstrated many times by Archibald and later by Mann that bile forced into the pancreatic duct under certain conditions will result in this fatty necrosis of the pancreas. Further evidence in support of this theory is the fact that the necrosis apparently begins in the tissues of the pancreas which immediately surrounds the pancreatic ducts. There are many factors regarding the character of the bile and the conditions under which it enters the pancreas that must be solved before the bile factor as the cause of pancreatitis will be established.

The time to institute operative treatment for acute cholecystitis is determined by the clinical manifestations. If many similar attacks have occurred, the general plan has been to postpone operating until the acute symptoms have subsided, which is in keeping with the policy in all acute abdominal conditions, namely, that it is safer and better not to operate during the height of an attack when the infection is most acute. However, if the acute symptoms of gallbladder disease do not subside, or if

they tend gradually to increase in severity, it is best not to postpone interference too long, for fear of extension to the liver or the pancreas, and the consequent development of a much more severe condition. In the cases in which we have operated during an attack, the results have been satisfactory.

Rupture of the gallbladder with the discharge of its contents into the general abdominal cavity has occurred rarely in our experience. In but few cases has an appreciable quantity of free bile, or stones and pus from the gallbladder been found free in the peritoneum at operation. One case only has been observed in which the common duct had ruptured or perforated, and in this instance several quarts of bile had escaped from the opening in the common duct.

There is evidence to show that the gallbladder often perforates, apparently with a very small opening, and as a result of a small amount of leakage an abscess forms. In such cases the infection may extend into the substance of the liver, and stones and pus may be found in a pocket in the liver. If there are stones in the gallbladder and none in this pocket, it is possible that the infection in the hepatic tissues occurred through the lymphatics and not from a perforated gallbladder. The perforation in the gallbladder may occur at the fundus and result in an abscess between it and the abdominal wall, or even in the formation of a subphrenic abscess. More often the perforation is near the cystic duct and causes the duodenum to be sealed to the gallbladder, many times resulting in a penetration of the wall of the duodenum. Stones are sometimes discharged into the stomach or duodenum as a result of such perforation. The operation in these cases is usually very tedious. Because of extensive infection, the duodenum will be firmly bound down and the opening in it, difficult to close. If the duodenum can be mobilized, the procedures are less difficult. If the perforation is situated in any other part of the intestinal tract, the result is not so serious, for if a fistula occurs, it will gradually close in the process of healing. However, if a fistula occurs from the stomach or duodenum, the outlook is serious because of the escape of gastric or duodenal contents and the consequent inability of the body to retain sufficient fluids and nutrition to prevent starvation. Every effort should be made to close accurately any fistula, or to cover over any area on the stomach or duodenum which becomes traumatized during an operation for acute

cholecystitis. If, in spite of this, a fistula does occur, through which are discharged the contents of the stomach or duodenum, it is probably best to reopen the wound at once and free the duodenum sufficiently to obtain a good exposure and closure of the fistula. Too often this procedure has been delayed in the hope that the fistula would close, and then carried out later, at a time when the patient's resistance had been impaired by lack of nutrition. In a few instances a jejunostomy was made and food supplied through a tube until the fistula closed; this procedure seems to be commendable if the opening in the duodenum cannot be closed.

Often cases are encountered in which the gallbladder has perforated into the colon. Such fistulas can usually be closed much more easily than those just described, because the hepatic flexure can readily be freed, the scarred and edematous tissue excised, and the fistula repaired.

In cases in which there is an associated biliary cirrhosis and jaundice, the gallbladder is usually small and often completely destroyed, so that the inflammation in it is of secondary importance to that in the ducts and other tissues. We have learned from experience the serious import of jaundice. It is much safer to postpone operating, if possible, until the jaundice has disappeared, or at least subsided considerably. If jaundice persists or fluctuates, but does not disappear, it will, of course, be necessary to operate while there is bile in the blood and tissues. The danger in these cases lies in the uncontrollable hemorrhage which occurs not only from the tissues incised at the time of operation, but from all of the mucous membranes. Before attempting to operate on a jaundiced patient, much can be accomplished in the way of preparation, as described by Walters. In these cases of deep jaundice, the coagulation time is very high, which accounts for the bleeding. As Walters suggests, this can be controlled at least temporarily by the intravenous administration of calcium. One dose is given every day for three days until the coagulation time has reached normal, or as nearly normal as possible. The patient is then in much better condition to withstand the operation. If death occurs because of the jaundice, it is due to uremia. The constant passage of bile through the kidneys has a marked effect on them. If both coagulation time and blood urea estimations are high, and these conditions are not improved by the administration of calcium and by increasing elimination, it is prob-

ably advisable to consider the patient inoperable.

Experience has taught us that the operation on a jaundiced patient should be confined to an attempt to facilitate the re-establishment of liver function. Obstruction in the ducts must be relieved by removing stones and other débris, and by establishing drainage. The gallbladder should be disturbed as little as possible; the stones should be removed and the infection eliminated, but usually the organ, itself, should not be removed.

If the acute infection in the gallbladder is accompanied by pancreatitis, methods of procedure will vary. If the pancreas is generally enlarged and definitely inflamed, removal of the gallbladder offers the best chance of complete and permanent relief from the trouble, since pancreatitis subsides more readily after removal of the gallbladder than it does after drainage. Pancreatitis rarely, if ever, reaches the point of obstructing the common duct as was formerly believed. If the cholecystitis is associated with fat necrosis the situation is serious. Certain authors advise postponement of operative procedure if fat necrosis is suspected. We cannot agree with this view as in our experience the results have been more satisfactory when the gallbladder and pancreatic tissues were drained. If the greater part of the pancreas is involved, it is probable that but little permanent relief can be afforded, and just as little operating should be attempted as will relieve the infection and the tension on the pancreatic tissues.

If acute cholecystitis is not accompanied by serious involvement of the liver or pancreas, but is a severe infection in itself, it may be best to drain the gallbladder first, with the idea of removing it later. This is probably the better plan in cases in which there is much evidence of general toxemia. In other cases, in which the gallbladder is large and filled with pus, or is gangrenous, we believe it is preferable to remove it at the first operation. If this can be done without opening it, recovery is usually rapid and complete. In cases of empyema, or in those in which the gallbladder has become gangrenous, it is sometimes impossible to determine whether or not there is a stone in the common duct. If there is reason to believe that there is, it will be better to drain the gallbladder and not to remove it, for in these instances it will be necessary to operate a second time when the infection has subsided.

Summary of cases of empyema of the gallbladder in which operations were performed at the Clinic in

1921.—The distinction between acute and chronic empyema of the gallbladder is purely clinical, as the surgical and pathologic pictures do not differ, and the acute and chronic conditions have the same macroscopic picture. The points necessary to a clinical diagnosis of empyema are a history of gallstones, an acute pain, and tenderness and rigidity over the gallbladder, usually with fever. The clinical picture of empyema does not seem to differ materially from that in any disease of the gallbladder. In one case the empyema was found during a laparotomy for ovarian disease. In a small number of cases, upper right abdominal tumor was the principal complaint. In most cases there was a general history of gallbladder disease with a number of hard colics. In only sixteen of the seventy-seven was there a history of jaundice; and in twenty-four of the same number, of fever.

The associated conditions found at operation were appendicitis, thirty-five cases; pancreatitis, twenty-seven; common duct stones, six; duodenal ulcer, one; and stones, seventy-seven. Drainage was used more often than not. Pancreatitis is often associated with gallbladder disease; it occurred in twenty-seven of seventy-seven cases in this series of empyemas.

The mortality is rather low following operative procedures. Of nineteen acute cases one patient died of bronchopneumonia, and of fifty-eight chronic cases one died of pulmonary embolism. There were five cases of empyema, one acute and four chronic, in which operations had been performed on the gallbladder. Two had had cholecystotomy, and three cholecystostomy, all with removal of stones. One patient of the group, with an acute condition of the abdomen, was found at operation to have a ruptured gallbladder with stones and bile in the pelvis. The gallbladder was removed and the duct drained. The pelvis was drained through a separate stab-wound incision.

The operative procedure in these cases depended on the acuteness of the process, the patient's general condition, and the degree of technical difficulty encountered in removing the gallbladder. The treatment of choice is cholecystectomy, but when the patient's condition and the technical difficulties contraindicate removal, cholecystostomy is performed, or, in some instances, part of the gallbladder is removed. Sixty-five cholecystectomies and twelve cholecystostomies were performed in the group. In

acute conditions with many adhesions, no undue exploring was done.

Prognosis is favorable in these cases. In our series of cases, although small, only two patients died, one from bronchopneumonia and one from embolism. The operative and pathologic findings are the same in the acute and chronic empyemas.

ACUTE CASES

Operation performed routinely in.....	5
Under observation with treatment before operation..	13
Emergency operation, ruptured gallbladder.....	1

CHRONIC CASES

Diagnosed as duodenal ulcer.....	1
Not diagnosed as empyema but as gallbladder disease	57
Cases of empyemas during 1921.....	77
Cases of gallbladder diseases during 1921.....	971
History of jaundice	16
History of fever	24
Stones in the gallbladder.....	77
Associated with stones in the common duct.....	6
Associated with pancreatitis	27
Associated with appendicitis	35
Associated with duodenal ulcer	1
Cholecystectomy	65
Cholecystostomy	12
Choledochostomy	11
Appendectomy	35
Closed without drainage (acute).....	1
Closed without drainage (chronic)	3
Total	4
Closed with drainage (acute)	18
Closed with drainage (chronic)	55
Total	73
Leukocytosis (acute)	11
No leukocytosis (acute)	8
No leukocytosis (chronic)	53
No count made (chronic)	5

January 1, 1907, to January 1, 1922

Gallbladders operated on.....	12,710
Perforating gallbladders	393
(3.09 per cent)	
Acute perforating gallbladder or common duct with bile in abdominal cavity.....	2
(0.5 per cent of 393)	
Fistula between gallbladder and duodenum.....	140
(1.1 per cent of 12,710; 35.62 per cent of 393)	
Fistula between the gallbladder and colon.....	42
(0.33 per cent of 12,710; 10.68 per cent of 393)	

CONCLUSIONS

1. Gallstones and cholecystitis should no longer be considered separately. The infection in the gallbladder is merely part of an infection which involves several other tissues.

2. Most marked changes may occur in the tissues of the gallbladder without clinical manifestations.

3. Severe symptoms may occur in cases in which there is but little evidence of infection in the gallbladder.

4. Acute perforation of the gallbladder with general soiling of the abdomen does not often occur, but chronic perforation and fistula formation into the duodenum, stomach, or colon is not rare.

5. Much can be accomplished by adopting pre-operative measures in a jaundiced case.

6. Pancreatitis in association with cholecystitis occurs as chronic infection and as necrosis of the pancreatic tissues and fat elsewhere.

7. It is advisable to remove an acutely inflamed gallbladder if the liver and pancreas are not extensively affected, and if there are no calculi in the common duct.

DISCUSSION

DR. H. B. SWEETSER, Minneapolis: Not knowing until this morning that I was to open the discussion on Dr. Judd's paper, I have had little time to consider it, and for this reason my discussion must necessarily be very brief.

An important point he makes is that many cases, with very few symptoms, reveal at operation very marked pathology. One of my recent cases illustrated this very forcibly. The patient gave a history of having had severe gallbladder symptoms a month before his admission to the hospital, lasting only a few days and followed by comparative comfort. Although we were expecting only a simple case at operation, the gallbladder was found distended with foul pus, perforated, with a large abscess walled off in the region of the pylorus.

Another serious impending danger of chronic gallbladder disease is the lighting up of an acute pancreatitis. One of my patients who gave a history of gallstone colic twenty-eight years before with no intervening trouble, was suddenly seized with agonizing pains at his doorstep and in twelve days was dead of an acute pancreatitis. In another similar case the entire pancreas was destroyed before death.

Perforation of the gallbladder into the intestinal tract with lodgment of a gallstone and consequent obstruction of the bowel is a further danger in these quiescent cases. One of our patients, a railroad conductor, was able to carry his train to Fargo and back again to Minneapolis before he gave up, eventually dying of acute peritonitis.

The important lesson Dr. Judd brings to us is that in cases of gallbladder disease giving none or only mild symptoms we should always urge operation, as the carrying around of such pathology is a continuous menace to sudden fatal disaster.

DR. WARREN A. DENNIS, St. Paul: As Dr. Sweetser said, this paper of Dr. Judd contains much meat that is extremely interesting, but it is out of the question to discuss all of the excellent points that were brought out in five minutes'

time. I wish to call attention to the fact that the old routes of infection of the gallbladder have been rather too much emphasized, and the probabilities are that the lymphatic route of infection, as pointed out by Graham, may be after all the most important. In the old days we thought the infection ascended from the duodenum, and later we thought it came from the liver and through the blood stream, and probably these different modes of infection did play a part at different times. However, the work of Graham has shown plainly that there is never a severe infection of the liver without gallbladder involvement. We know the importance of the liver in destroying infectious organisms. The relation of the two organs is intimate. The corollary is this: When the gallbladder is once severely infected, the probabilities are it is difficult for it to become normal. We have seen gallbladders drained and the patients have gone many years without trouble, but a good many gallbladders that have been drained are operated on again. The extension of infection is not chiefly to the cavity of the gallbladder, but to the wall, and that leads to interstitial changes which make it difficult for the gallbladder to function normally and make it more subject to future infection.

Other things being equal, cholecystectomy is the operation of choice rather than cholecystostomy. Dr. Judd has very well considered the question of cholecystectomy versus cholecystostomy, and, as he has said, a number of things will have to be considered. In the case of an acute inflammation of the gallbladder, if conditions are such that the gallbladder can be removed expeditiously without great trauma, it should be removed, provided there is no evidence of inflammation and stones in the common duct. If the difficulty in removing the gallbladder is mechanically great, it is much better simply to drain the gallbladder at that time, or if there is a stone in the common duct, it is wiser to drain to relieve the back pressure and jaundice, and do a cholecystectomy at some future time. We must consider the general condition of the patient. In a patient who is critically ill, that thing is most important which relieves him of some strain and enables him to get in a better condition to have that done later which needs to be done to relieve him of the pathology and make him permanently well.

I recently saw a serious acute gallbladder case in which there was a stone in the common duct, with a slight amount of jaundice. We drained the gallbladder, and I consider that good surgery in such cases.

I do not regard the exploration of the common duct after removal of the gallbladder as an insuperable proposition. I have had to do it several times, and while there is difficulty in finding the duct, usually it can be done without any great danger.

I have enjoyed Dr. Judd's paper very much, and I agree with Dr. Sweetser that it will bear a great deal of study.

DR. ARCHIBALD MACLAREN, St. Paul: It seems to me, there should be a rule in regard to the treatment of an acute gallbladder, and Dr. Judd has brought out the point that it is very dangerous to remove an acute gallbladder. The reason for this, it seems to me, is that after a cholecystectomy we leave a considerable raw surface under the liver through which you get an acute septic infection which rapidly carries off the patient. I have had three such cases in one winter. These cases are so desperately ill that they

cannot get on a train and go to Rochester. They cannot move around town; you get more of them in a large community. I have noticed that surgeons get a great many of them in New York; we get a few of them in St. Paul, and a few in Minneapolis, but it is the acute type of gallbladder trouble of which they complain. I rather think that at present we ought to make it a rule not to remove acute gallbladders. I would rather operate two or three times than do one successful operation and never have another chance. As a rule, these patients do not stand cholecystectomy. This type may be described as gangrenous; it is like an appendicitis. We know that there are different degrees of appendicitis; some of the cases seem to be almost as acute as those we encounter in gallbladder work. Many of the symptoms are as pronounced. Of course, you can remove the ordinary cystic gallbladder, but in the gangrenous and especially in the perforated gallbladder you are taking long chances. You often cannot quite distinguish which is the most severe type. At present, speaking for myself, I have made it a rule to drain these gallbladders, and I have not lost any patients lately by so doing.

DR. WALTMAN WALTERS, Rochester: Dr. Judd has asked me to describe briefly the method of preparation that has been used on these jaundiced patients. Thirty-four patients with an extreme degree of jaundice were operated on during the past year, and not one died from hemorrhage. During a similar period previous to 1921 when a few doses of calcium by mouth or a blood transfusion consisted of the preoperative preparation, fifty per cent of the deaths from operations on jaundiced patients were due to intra-abdominal hemorrhage. The preoperative preparation employed during the past year consists of daily intravenous injections of 5 c.c. of a 10 per cent solution of calcium chlorid for three days. In addition, large quantities of fluid are given by mouth and glucose solution by rectum. This increases the body fluids and at the same time assists in elimination of the bile pigments which King, Bigelow and Pearce believe are the toxic elements in obstructive jaundice. These circulating bile pigments, they believe, combine with a portion of the free calcium in the blood and lengthen the coagulation time, so that clotting is delayed beyond normal limits. For this reason calcium chlorid is supplied intravenously. My associates and I have been doing both clinical and experimental work on obstructive jaundice for the past two years, and we have not been able to produce any deleterious effect on humans or on animals with three intravenous injections of 5 c.c. of a 10 per cent solution of calcium chlorid made up in redistilled water, when given at daily intervals.

Tomorrow we will go into more detail regarding the preparation and the results that were obtained.

DR. E. STARR JUDD, Rochester (closing): I cannot quite agree with Dr. Maclaren regarding the removal of these gallbladders. We can discern something of the existing condition by the amount of general toxemia present. In the last two or three years we have removed more such gallbladders than formerly, because we have seen the serious consequences of not removing them. In some instances, however, stones have been removed at the first operation, without removing the gallbladder because conditions have not seemed to warrant such a procedure.

CONCERNING THE VOMITING OF PREGNANCY AND ITS TREATMENT*

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It has been estimated by various observers that about 50 per cent of women vomit during pregnancy. If this is true, there follows what is equally as true, namely, that about 50 per cent are entirely free from this distressing symptom. The percentage of those who are victims of what is termed "pernicious vomiting" varies so much with the different observers and the groups of patients in which the observations are made, that the figures mean but little and have no particular bearing on the subject-matter of this paper.

The questions arise, Why should some women be entirely spared the unpleasant experience of vomiting during pregnancy? Why should an equal number have vomiting of a mild degree, known as "morning vomiting"? And why should another very small group vomit to such an extent that their case becomes serious, necessitates hospital care, may call for the termination of pregnancy, and, with or without this procedure, may terminate fatally?

Many theories have been advanced, all of which have some scientific foundation and therefore merit consideration; any one of them may explain fully and satisfactorily any one case, but none of them has ever satisfactorily explained all cases. The various theories have this in common, however, that they all concede the presence of an underlying toxemia although they differ as to the nature and origin of the toxine. In recent years, however, the tendency has been to regard the toxine as metabolic in nature and hepatic in origin.

The vomiting of pregnancy has been divided into the reflex, the neurotic and the toxemic. In the first group are placed those cases in which can be demonstrated some anatomical lesion, such as uterine displacement, long and rigid cervix, lacerated cervix, pelvic tumors, endometritis, etc., the correction of which, if advisable, will greatly ameliorate the vomiting. Patients suffering from what is classed as the neurotic type of vomiting present a neurosis very similar to a hysteria and in the treatment of these cases suggestion plays a very

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important part. The toxic type is the severe or so-called pernicious type and this diagnosis is justified when the vomiting renders the patient unable to retain any considerable amount of food.

Williams states that there are three types of serious vomiting, namely, reflex, neurotic and toxic, with a toxemia as an underlying factor in all cases and offering itself as a predisposing factor in the reflex and the neurotic types. Polak, in his recent book, makes the same classification, but refers to them as three types of pernicious vomiting with an underlying toxemia of hepatic origin and due to a disturbed metabolism.

In his monograph of 1906, Williams states that the finding of an anatomical lesion enables us to make a diagnosis of reflex vomiting and that this generally presents no great difficulty. In the absence of such a lesion, however, a much greater difficulty presents itself in the differential diagnosis between a neurotic and a toxemic vomiting. He lays great stress on the ammonia coefficient and states that in the neurotic type this is normal, while the toxemic type may be diagnosed when the coefficient reaches ten to fifteen per cent and that this percentage affords sufficient reason for the termination of pregnancy. The ammonia coefficient may reach as high as thirty to fifty per cent.

Polak thinks that the neurotic type is not usually difficult of recognition, usually occurring in women with a manifest neurosis. Hurst, in the *Lancet* of March 18, 1922, reports a case of so-called pernicious vomiting of pregnancy with high ammonia coefficient cured by psychotherapy. The patient was about three months pregnant and had been vomiting for two and one-half months. The urine showed an ammonia coefficient of 28, a large amount of diacetic acid, no albumin and no sugar—a condition justifying the diagnosis of vomiting of the toxemic type. Her pulse was 120, skin dry and inelastic, tongue dry and furred; she had vomited everything, fluids as well as solids, and continued to do so even when receiving saline solution by rectum without anything by mouth. Further examination revealed the presence of a purely neurotic basis which, when corrected by suggestion, caused the vomiting to cease and the urine to become negative.

The writer is of the opinion that the significance of the ammonia coefficient has been exaggerated, if not entirely misinterpreted. The presence of a high ammonia coefficient simply diagnoses an

acidosis while the acetone bodies are indicative of a disturbed metabolism and neither of them in any way diagnoses the type of vomiting with which we are dealing, nor the presence or absence of any other underlying toxine.

Williams, in the latest edition of his popular text-book, expresses an opinion quite different from that given in his 1906 monogram. He admits that a high ammonia coefficient may result from the in-anition occasioned by a prolonged neurotic vomiting as well as from a toxic vomiting; that a coefficient of five per cent or less indicates a neurotic vomiting, that a high ammonia coefficient does not necessarily predicate the existence of toxemic vomiting, but that when it exceeds fifteen or twenty per cent it clearly indicates that the patient is seriously ill.

The urinary findings are very important. The amount is usually scant, depending on the severity of the vomiting, is highly colored and highly acid and of high specific gravity. The presence of acetone and diacetic acid is very suggestive. Sondern regards acetonuria as one of the first signs of toxemia of pregnancy. The total urinary nitrogen is reduced as is urea also, while the amount of nitrogen in the form of ammonia is much increased, hence the high ammonia coefficient. The presence of albumin is secondary and is due to the irritation of the sub-oxidized metabolic products, and the pathology of the kidney is limited to the convoluted tubules. Bile may be present, as bile stagnation is characteristic of this condition. In the terminal stages it is present, together with albumin and casts in large amount. Diastase is present in large amount but is not due to a deranged pancreas.

The most recent and at the same time the most definite advances that have been made were given to us in the publication of Duncan and Harding in 1918 in their article on high carbohydrate feeding in this condition; by a second publication by Harding last year; by Titus and his associates in 1920 and by Lynch in 1919.

These investigators have all attempted to explain the nature of the pernicious vomiting of pregnancy by applying to that condition the conclusions arrived at by a closer observation of the mild or so-called "morning vomiting." Harding has called our attention to the short and the long cycle of vomiting, the former being represented by the different periods of the individual day when the vomiting

manifests itself, and the latter by the period of pregnancy in which this condition is most marked, namely, the first trimester.

These investigators are all agreed that the toxine involved is metabolic in nature and origin and is due to the increased demand for glycogen on the part of the growing fetus. The maternal organism may be successful in meeting this demand or it may fail more or less in its attempt. The time of day when the maternal organism may be most reasonably expected to be least able to meet this demand is after a period of starvation, and the longest such period is between dinner and breakfast of the following morning and this explains why so much of the vomiting of pregnancy manifests itself in the morning hours. Close questioning, however, often reveals the fact that a second and a third wave of nausea and vomiting manifest themselves shortly before the other meals of the day and even a fourth one at bedtime. In fact it was the oft repeated statement on the part of my patients that waves of nausea and vomiting manifest themselves at those times of the day when they have been without food, together with the unsolicited information that this discomfort can be controlled, if not entirely overcome, by the eating of a small amount of food, that caused the writer to pay closer attention to the theory of starvation and glycogen deficiency—in fact, to become quite partial to it. This explains the minor periodicity of this condition.

Slemons showed three years ago, in his article on the "Nutrition of the Fetus," that all soluble products of digestion pass from the maternal blood through the membranes of the chorionic villi into the blood of the fetus, but that insoluble products do not; in other words, that members of the non-protein nitrogen group of substances and glucose pass freely through this membrane, but all observation and experiment have failed to show that fat is contributed in any such way by the mother to the fetus. This means that the fetus is dependent on maternal glycogen for its fat supply, thus creating a much greater demand for the products of carbohydrate metabolism than for that of the other foodstuffs.

One of the functions of the placenta is that of glycogen storage, but until this organ is physiologically able to carry on this work, which is at the third or fourth month of pregnancy, the fetus is dependent on the maternal organism for its supply. In this way Harding explains why the vomiting of

pregnancy is confined largely to the first trimester, which he designates as the major periodicity.

If, then, during pregnancy this demand for glycogen is amply met by the maternal organism at all times of the day and throughout all the first trimester, then we have a patient who does not vomit and who belongs to that group of almost 50 per cent who are free from this disturbance. If the demand is greater than can be met by the maternal organism, then we have the factor of vomiting introduced and its severity will depend on the margin between supply and demand.

The woman who is unable to retain sufficient food is dependent on her own body tissues for sustenance which is equivalent to a diet high in fats and proteids and deficient in carbohydrates. This unbalanced diet results primarily in a fatty infiltration of the liver, followed by cellular degeneration and necrosis, which is most marked about the central vein. The fatty acids resulting therefrom must be neutralized by alkalis from the normal body reserves, resulting in their more or less complete depletion and giving rise to the condition of acidosis with its high ammonia coefficient. This is one explanation as to the etiology of the high ammonia coefficient. Another is that the fatty infiltration and degeneration of the liver cells render that organ unable to complete its proteid metabolism, thus allowing urea to be excreted in the form of its forerunner, ammonia. The acetone bodies are the intermediate or suboxidized products of imperfect fat metabolism made possible by a deficiency of carbohydrates.

This vomiting of pregnancy finds its parallel in the cyclic vomiting of children. Without entering into a discussion of the presence or absence of an underlying toxemia in the latter condition, we do have a condition of food rejection resulting in a highly unbalanced diet and bad metabolic chemistry. This results in an abundance of fatty acids in the intestinal tract, the neutralization of which gives rise to an acidosis, a high ammonia content of urine and feces and an acetone odor to the breath. The treatment for this condition, beyond immediate measures to control the vomiting, is a high carbohydrate diet.

The question presents itself for consideration—just when does the ordinary vomiting of pregnancy become pernicious? Is it dependent on the time of day of its appearance, the severity of the vomiting, or its duration; or are we to be guided by

the physical effect upon the patient? Women differ in their degree of tolerance; one patient may vomit twice daily and suffer more than her sister, who vomits three and four times daily; some vomit food and others bile and mucus; some can retain certain kinds of food while others vomit all. Vomiting may be quite frequent without any disturbance of metabolism as revealed by urinalysis, so the writer suggests that we reserve the designation of "pernicious" for those cases which show acetone bodies, bile and a high ammonia coefficient in the urine.

The immediate cause of death in these cases is a mooted question. Clinically and pathologically, the fatal cases present the picture of yellow atrophy of the liver and the explanation given is that the infiltration, degeneration and necrosis of the liver cells is so extensive and so severe that the liver is incapacitated for further functioning and death ensues. Another explanation is offered by the factor of acidosis as presented by Symons in the *Lancet* of April 1, 1922. In his observation on children he found that if it required more than 200 gms. of soda bicarbonate to render the urine alkaline the case proved fatal and Symons argued that the normal alkali depots of the body had been so completely deprived of soda and their other alkalies that they had lost their power of resupply. Applying his observations to the condition under discussion, it may be that the cause of death is a true or extreme acidosis.

To summarize, we have the state of pregnancy which creates a greater demand for glycogen. If the patient's health is normal and the demand not too great, vomiting does not take place. If the demand is excessive, or if there is some preexisting hepatic derangement or if the patient's health is undermined by an additional reflex or neurotic disturbance, then vomiting does take place. If the vomiting is not controlled, metabolic changes take place due to what is equivalent to a diet high in fat and low in carbohydrate content, resulting in fatty infiltration of the liver, the appearance of acetone bodies in the urine together with a high ammonia coefficient, which findings justify the diagnosis of pernicious vomiting and which condition, if not controlled, will result fatally.

The treatment of the pernicious vomiting of pregnancy calls for the correction of any reflex factors, the treatment of a neurosis if any exists, and the correction of all errors of hygiene; it calls for isolation and hospital care; and time can be saved

by not attempting any oral medication. Three conditions must be combated without delay, namely, dehydration, carbohydrate deficiency and the vomiting. This can be done by the rectal administration every four hours of six to ten ounces of a five to twenty-five per cent lactose solution with sixty grains of bromides added. Carefully given, this should be retained, but if not, subcutaneous and even intravenous administration may be resorted to, although the writer has never found it necessary. This treatment resupplies fluid to the tissues and saturates them with carbohydrates easy of assimilation and restores the detoxicating power of the liver while the bromides in such large dosage bring about a condition of bromidization which is highly desirable. This state of bromidization is akin to the state of hibernation of the lower animals in that metabolism is at a very low level and the nutritive value of the carbohydrate thus administered suffices for the time being. If there is no vomiting for forty-eight hours the patient may be allowed a soft carbohydrate diet by mouth, without liquids, in addition to the rectal feedings. Gradually the strength of the lactose can be reduced and the amount of the bromides also. Glucose can be substituted for the lactose while chloral hydrate instead of the bromide at the evening feeding will promote sleep. If the carbohydrate diet is retained, proteins may next be added but fats must be left until the last.

Patients whose vomiting is not sufficiently severe to warrant hospital isolation may be treated at home by means of a high carbohydrate diet partaken of frequently during the day rather than the usual three meals. The lactose solution may be taken by mouth. Alkaline solutions may be administered with the lactose or alternating with it, but it must be remembered that alkalies, while they overcome the condition of acidosis, do not combat the condition which produces it. The urine should be examined frequently to detect a glycosuria.

In 1918, Duncan and Harding reported seventy cases of mild, moderate and severe vomiting treated in this way, all of whom recovered and went to full term. In 1920, Titus reported seventy-six cases and in 1921 Harding reported 200 cases with but few failures. These men worked independently of each other.

CASE REPORTS

CASE 1, Mrs. L.

This patient had her last menses on January 15th. On February 22nd, vomiting began and increased in severity

until she vomited five and six times daily and was forced to seek hospital care. She was admitted to my service on March 7th. A bimanual examination on the following day revealed a retroflexed uterus which, when corrected, reduced the vomiting to about half. From then on gradual improvement took place until the ether for a tonsillectomy aggravated the condition. When seen at the office on April 24th she was vomiting one to three times daily but a diet high in carbohydrates controlled the condition.

This case illustrates what is understood by the reflex type of vomiting. Subsequent events showed that she was pregnant with twins. A plural pregnancy is often referred to as a reflex factor but Harding claims that it is only reasonable to regard a twin pregnancy as making a double demand on the maternal organism over what a single pregnancy would.

CASE 2, Mrs. M.

This patient was a divorced woman with three children. She loved not wisely, but too well and had no menses after December 26th. She was admitted to my service on February 9th, suffering from severe vomiting. This had been present for two weeks and was so severe that she ate only one meal a day while for three days before admission she had vomited every meal. The urine showed a trace of albumin. The man in the case called at my office and expressed much concern about the condition of the patient. He felt sure that she would not get well and it certainly would break his heart to see three beautiful children left orphans. Their religious faith did not permit the marriage of divorced persons. The patient herself felt that the pregnancy should be terminated. When it was made plain to her that an abortion would not be performed and the sooner she ceased to vomit the sooner she would be able to leave the hospital, it was remarkable how rapidly she improved.

While neither of these cases could be classed as pernicious according to the definition given, they both could have become so if permitted to continue. Case 2 illustrates what is understood by the neurotic type of vomiting. CASE 3, Mrs. G.

She missed her menses on November 3rd. Nausea started in eight days, vomiting was present on the tenth day and I saw her in the hospital on the 25th of November, when vomiting had been constant for two days. She was given immediately 6 ounces, every four hours, of a 20 per cent lactose solution by rectum with 60 grains of bromide. Urine on the following morning showed sugar, acetone and diacetic acid. She vomited once on the day of admission. At the end of two days she was given by mouth a semi-solid diet of carbohydrate, and on the fifth day proteins were added. On the fourth day rectal medication was discontinued. On the sixth day she was put on a full diet, and allowed to go home on the tenth day. She is now in the last month of her pregnancy and there has been only occasional vomiting since leaving the hospital.

CASE 4, Mrs. W.

Patient had her last menses on August 30th. Nausea started on October 1st and vomiting on the 15th. She was seen in consultation on November 12th, when she stated that she had been vomiting incessantly for the last two

or three weeks and that the spells were now coming at ten to fifteen minute intervals, even during the night. She was sent to the hospital and was given, rectally, 6 ounces every four hours of a 10 per cent lactose solution with 60 grains of bromides. She vomited four times during the first thirty-six hours but not after that. Urine for twenty-four hours was 18 ounces and contained a trace of albumin. On the fourth day she was given a carbohydrate diet, on the seventh day proteins were added and she left the hospital on the eleventh day on a full diet. No more trouble; delivery on May 3rd.

CASE 5, Mrs. B.

I saw this patient first on August 26th. She was two months pregnant; vomiting began about July 15th, and had been growing worse until it was incessant, irrespective of food, and occurred even at night. Patient was much wasted, the skin loose and flabby, and sclera jaundiced. The urine amounted to less than 500 c.c. in twenty-four hours, was highly acid, deep amber in color, of 1020 specific gravity with acetone present and urea 2.75 per cent. Rectal medication of 10 ounces of a 5 per cent lactose solution every four hours was started, but without bromides.

Throughout the first week her condition remained about the same. The urine had increased to 1,000 c.c. with sugar present and a trace of albumin and acetone. All rectal feedings had been retained, the icterus had not changed, the vomiting and salivation were about the same, the pulse had reached 120 on several occasions and she was nervous and irritable. Bromides were added and abortion seriously considered. At the end of another forty-eight hours her condition was favorable.

On the ninth day she vomited for the last time; on the eleventh day she was put on a solid diet of carbohydrate, the jaundice had disappeared, the urine amounted to 1,250 c.c. without acetone or bile, but with sugar present. From here on improvement was satisfactory and she left the hospital on the 25th day after she had had no vomiting for two weeks and was on a full diet. This patient had a rather high pulse throughout, was jaundiced and had bile in the urine and vomited blood but recovered and went to full term.

CASE 6, Mrs. Q.

The patient had had her last menses on July 26th and started to vomit in earnest on September 26th. It was of the all-day type, irrespective of food, and the condition was growing worse. She had had much nausea and vomiting in a former pregnancy. Examination shows the eyes to be clear, tongue clean and moist, skin moist and soft, abdomen soft and a bimanual examination proved negative.

She went to the hospital and was immediately placed on 10 ounces of a 5 per cent lactose solution with 60 grains of bromides, rectally administered. Urine was scant, highly colored, 1022 sp. gr., contained acetone and diacetic acid and urea 2 per cent. At the end of the third day she had stopped the vomiting and from here on the rectal medication was gradually reduced and she was given a carbohydrate diet. Her improvement continued and was satisfactory. On the ninth day the urine was clear, 1006 sp. gr., and she left the hospital at the end of two weeks. Three days before leaving the hospital her blood urea nitrogen

was 9 mgm., creatinine 2.25 mgm. and blood sugar .14 per cent.

After being at home for two weeks she was seen again, as she had been vomiting for two days. This came on immediately after the ingestion of orange juice followed by custard. The urine again showed acetone and diacetic acid. The same treatment was started but on the third day coma developed, the pulse grew weaker, temperature rose to 102.3 degrees and at midnight of the fourth day she aborted and died at 9 A. M. There had been no jaundice and no blood in the vomitus.

This case illustrates what Hirst, the exponent of the corpus luteum theory, called our attention to, namely, that a relapse in these cases is more rebellious to treatment than the first attack. Also that an abortion, either spontaneous or therapeutic, if coming on too late, hastens a fatal termination rather than giving relief. It also shows that any disturbance may start the vomiting—in this case indiscreet diet.

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A PANCREATIC CYST IN THE LEFT HYPOCHONDRUM—EXTIRPATED*

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Koelliker (1879) recorded a pancreas of a rabbit embryo as divisible into two distinct glands. Phisalix (1888) described a human specimen of 10 mm. He found the pancreas represented as two separate outgrowths: one, the superior and larger, known as the dorsal pancreas, the duct of which was to become that of Santorini; the other, inferior and smaller, now known as the ventral pancreas, whose duct was to be the Wirsung. Hamburger (1892) states that the anastomosis of the two is complete in an embryo of six weeks. The smallest embryo in which they were fused was found by Keibel and Elze to be 12.4 mm., the largest in which the bodies were still separate was 14 mm.

Anatomically the pancreas is protected by position, but because of its histological structure it is highly vulnerable nevertheless. Not only is there

a scarcity of connective-tissue network and a rich vascularization, but the cell protoplasm of the epithelial elements evince great lability. Furthermore the gland holds within itself factors of destruction in the form of ferments which may become activated in an untimely manner. There are two sets of superimposed glands around a common duct: the upper or common acini pour their secretions into it; the lower one of the islands possesses neither ducts nor other orifices. The innervation is very abundant, from the sympathetic and the vagus, the former being the constrictors. There is intimate relation of glandular function with the spleen. Indeed activation of the pancreatic ferment for the blood stream is dependent upon the splenic ferment. The great need of oxygen is expressed by the enormous blood supply, from the gastroduodenal artery and the two branches of the superior mesenteric, besides those from the hepatic and splenic arteries. The terminal arrangement for the fluid exchange is not like the glomeruli of the kidney. The dilated end vessels are like ampullæ with narrow inlet and outlet, so that the filtration and mixing of cell and blood fluids bearing the components of the activated ferments become dependent upon centrifugal pressure, the vessel walls having been shown to be very porous (Ramon y Cajal, Opie, Sajous, Popelski, Schiff, Haidenhein, Herzen, Saviati, et al).

The pancreatic duct may continue to empty into the bile duct. More often the two ducts reach the duodenal surface independently, either at the base of the ampulla or at the summit of the nipple-like projection (Keibel & Mall). The obliteration of the duct of the dorsal pancreas is probably not infrequent. Pancreatic tissue is often found in the papilla of the duct, the papilla minor. It sometimes surrounds the portal vein, the bile duct and the intestine. Accessory pancreases are of frequent occurrence (Symner, Opie, Gardiner).

These remarks may serve for orientation in the discussion of the following case:

Mrs. B., age 27 years. Her father, a vigorous man, died in a railroad accident. Her mother is well after a gallbladder operation eight years ago. Mrs. B. was the only child. In early infancy there was an accident to her right eye. At the age of twenty she married. She had three normal confinements and three healthy children. Her menstruations before and after marriage were normal, regular and painless.

About a year ago while cleaning house she fell against a chair. Though being breathless at the time, she felt well until about eight months later, when she was suddenly

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seized with an agonizing pain in the upper abdomen. A physician was called, who succeeded in making her comfortable with a hypodermic of morphine. About four months later the writer was consulted regarding a "lump" she had noticed in her left side, near the costal border between the mid and anterior axillary lines.

There presented a well proportioned woman, apparently in excellent health. Her right pupil appeared as an opacity. The chest revealed nothing abnormal, both lungs and heart being free from disease. There was no fault to find with her pelvic organs. On inspection the topography of the abdomen and the relations of its movements and size appeared entirely normal, except for a greater prominence of the left upper quadrant. Palpation revealed a globular

ill effects from my fall at that time. During the five or six years following I had considerable trouble with my stomach. There was always a distressed feeling and often I was very dizzy, and my heart beat fast. When my first baby was two months old I was taken very sick. I had severe backache extending up to my shoulder blades; I was sick to my stomach, chilled and unable to talk. I suffered so at that time I hardly know how to describe my condition, it seeming as though a wedge were prying me open. After this spell I had continuous pain in the upper abdomen. Later the same attacks returned and became more frequent. During my third pregnancy I fell off a chair while cleaning house but felt none the worse for that. After the third baby was born, the spells of pain

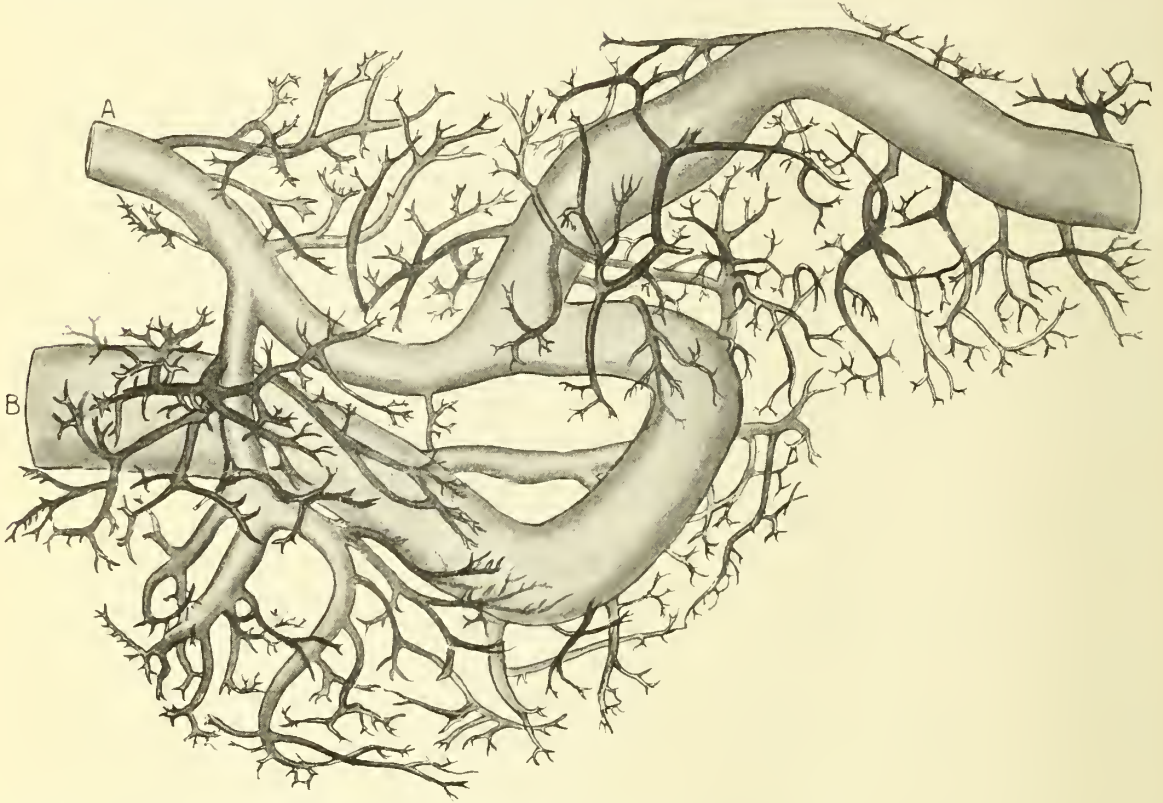


Fig. 1.° From Keibel and Mall. (A) Ductus pancreaticus dorsalis (Santorini). (B) Ductus pancreaticus ventralis (Wirsung). Thynge model x 50, 7.5 mm. embryo.

body between the costal border and the crista. The anterior axillary line marked its mesial limits; the posterior contour was uncertain. It did not move with respiration, was not tender, could not be displaced, and was only slightly movable. Of a grape fruit in size, rather regular in outline, it was elastic in consistency and at times it gave the sensation of fluctuation, the colon lying ventral to it. It was thought to be of the kidney. The urine was normal in quality and quantity and time of production. Both ureters were catheterized and the secretion from each of them was normal in every respect. Examination of her blood proved negative and the blood pressure was normal. Later, while convalescing, she got to thinking of her case more intensely and then gave another history, as follows:

"When I was ten years old I fell from a bicycle and landed on my left side on a street car track. I felt no

grew unbearable. The last one I had was so bad that I could not breathe; my heart seemed unable to beat and the pain was agonizing."

Diagnosis: A tumor in the left upper abdominal quadrant, smooth, elastic, painless, semi-fluctuating, of a large grape-fruit in size, located retroperitoneally.

Operation: Transverse incision between crista and last rib on the left from erector spinæ forward dividing everything, finding peritoneum, pushing it out of the way, and entering the retroperitoneal space. The tumor, a cyst, presented. It was easily wiped free from the mesocolon, the mesentery and the pancreas, and the impression gained was as though the growth had been stamped with pancreatic tissue. At the pelvis of the kidney the tumor was firmly attached to the fatty capsule so that it seemed a part of it. To prevent injuring the kidney the cyst was opened. It

was filled to a point of pressure with very bright blood. It looked like a serious hemorrhage at first glance, but the blood was not quite normal and seemed laked. Having emptied the contents, the bottom of the growth was pulled up and, leaving a part of the fibrous capsule attached to the kidney, the tumor was cut free and removed. Hemostasis made positive, the severed muscular structures were readjusted with chromic gut. The subcutaneous fat and the skin were united separately with plain gut and the wound sealed with collodion. Healing per primam, recovery was uneventful. The patient has been free from discomfort and in good health for seven years.

A cyst (Ziegler) is a circumscribed cavity which is shut off from the surrounding structures by a connective-tissue membrane, or by tissue of complex structure, and whose content is different from the capsule.

Following the earlier writers, Speese divides the pancreatic cysts into four main groups.

1. The proliferation cysts. Lazarus calls this form most common, but not often recognized. Kleinschmidt collected twenty-one cases in 1907, Speese thinks they are the most uncommon.

2. The retention cysts.

3. The degeneration cysts.

4. The pseudocysts. They may also be arranged in two groups (Lazarus) according to their epithelial or connective tissue lining. To the former belong the cystomata and the retention cysts, while the latter would comprise the degeneration cysts and the cystoids.

Koerte speaks of endo- and peri-pancreatic cysts; among the latter, the ones that are formed by breaking into the bursa omentalis he named pseudocysts. The cases of cystic disease reported are growing more numerous, Judd describing forty-one cases from the Mayo clinic alone. The epithelial-clad cysts are rather scarce and with these women seem to predominate. Men are more frequently met with in the other group. They are cystoids and may be endo- as well as peri-pancreatic. Ipsen calls them digestion cysts. This group must swell to greater proportions if by digestion the epithelial elements of the capsule lining are lost.

Like all other vital organs the pancreas must be considered more and more as a link in a system of organs physiologically as well as pathologically related in their functions and dependent upon each other. Therefore it may be permitted to ask, what is the analogy of the ulcer of the stomach or of the splenic infarct in the pancreas? Wachter asserts that it is the cyst. The secretion of the gland activated by some means or other prevents the typi-

cal proliferation of connective tissue as seen in the infarct, and the pathological change is directed by the conditions peculiar to the pancreas. The destructive action of steopsin, splitting fat into fatty acids and glycerin, is well known under the name of "fat necrosis." Trypsin is of still more importance. The spleen plays a rôle in the elaboration of the proteolytic ferment for the blood (Mendel, Herzen). The smallest trace of enterokinase, the intestinal secretion, is sufficient to activate any amount of trypsinogen, if enough time is allowed (Starling, Stewart). The most potent means next to enterokinase are the lime salts, taking twelve to sixteen times more than the former (Starling). The entrance of bile has also been adduced (Archibald) as being indirectly another activating agent. The normal cell is protected against the action of its gland. What happens when the resistance of the cell has been reduced, as by interruption of the blood and lymph currents, or by other means, has been investigated by many. Gulecke and others have injected intestinal contents into the ducts; Poloya used active trypsin; Opie, Hess, Hlava em-

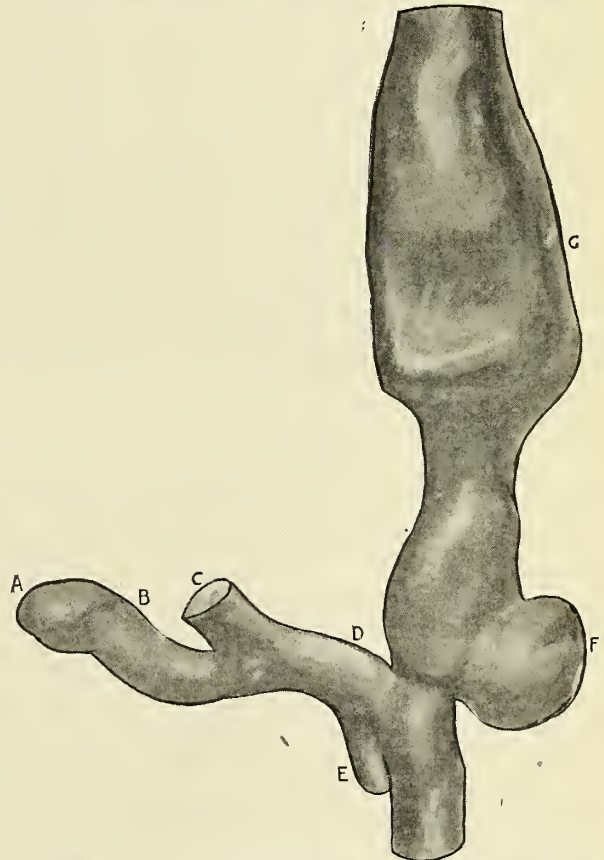


Fig. 2. From Keibel and Mall. (A) Vesica fellea. (B) Ductus cysticus. (C) Ductus hepaticus. (D) Ductus communis choledochus. (E) Pancreas ventralis. (F) Pancreas dorsalis. (G) Gaster.

ployed bile, blood, oil, and gastric juice; Chiari pointed to auto-digestion as a frequent occurrence, and Beneke showed that a temporary local ischemia sufficed to effect a high degree of alteration in the pancreas. It was Bunge who cleared the situation. His compressing of the gland for ten minutes, and his tying of two main arteries for twenty minutes, as well as permanently—all had the same outcome, namely, the formation of small necrotic foci without a surrounding zone of pancreatitis. They were usually of the nature of anemic infarcts, only sometimes hemorrhagic. Bunge is the only investigator (Waechter) who allowed his animals to live long enough to see cysts form in the damaged areas. So it was only necessary to diminish the vitality of the pancreatic cell. The contents of these cysts were turbid, some were bloody.

If these experiments had such results in healthy animals, how much more must this be the case in individuals weakened by disease. Usually the two ferments are both active and when their effect grows

markedly destructive, spreading quickly, there appears the symptom complex of acute hemorrhagic pancreatitis, pancreatic apoplexy or acute pancreatic necrosis. Where this condition is extensive the patient dies, but it happens not seldom that patients survive the attack and the areas destroyed are then entirely absorbed, even in case of an abscess, or they constitute a cavity filled with fluid—a cyst (Ipsen). However, such a serious onset does not always take place. Digestion at the start may be very limited and may go on without giving rise to symptoms of gravity, yet the pancreatic secretion drains steadily into the cavity. With activation, the walls will be digested, the cyst growing partly

by decomposition and partly by more secretion running into it. The growth may be insidious, extending over years, or it may be paroxysmal, being favored by various conditions such as hemorrhage, parturition, or other general exhausting disease. The location of the process may be within the pancreas, at its surface or even outside of the gland altogether. Lewit, Friedreich, Mayo, Robson, Seitz, Langerhans, Cammidge and others regard chronic pancreatitis as pathogenic in cyst formation, forcing stasis by mechanical stagnation, intestinal changes, induration and fatty degeneration, and bringing about retention of secretion.

This is prone to occur in the tail of the pancreas (Speese), the favored seat of the proliferation cysts. Chronic pancreatitis may be the result of systemic disorders such as arteriosclerosis, alcoholism, syphilis, or, locally, of cancer and infections from the stomach and the intestine and especially from the gall bladder, when the anatomical conditions are favorable in a manner above



Fig. 3. Microscopic section of case reported showing a large pancreatic duct lined with columnar epithelium and crypts of acini.

mentioned. Contemplating the matter, we may be permitted to believe that though the pancreas, like other organs, is subject to cystic disease, it not only modifies this phase of pathology by means of its inherent forces, but can also give rise to characteristic cysts as a consequence of insults to which other organs react differently. We could thus speak of real cysts found in the pancreas (pancreatic cysts), these being real from a clinical standpoint.

Our case was considered as being of the latter group and probably of traumatic origin. The mechanical insult, perhaps, caused a contusion of a part of the tail of the pancreas, of the peritoneum

and of the capsule of the neighboring kidney, resulting in a hematoma. Tearing of the tissue and damaging of the cells led to an outpouring of some glandular secretion. A slow digestion ensued within the bruised area, fatty tissue was decomposed and perhaps some small part of the gland became necrotic. Further progress of the pathology ceased until pregnancy brought about a condition under the influence of which the dikes would not hold. There was considerable pain and other symptoms of a limited acute pancreatitis and slow return to quiescence. After the third pregnancy she had so severe an attack that she became aroused. She was now watchful and observant so that she noticed the "lump." It would have been interesting to know if she had fever or other symptoms during the paroxysms. It appears certain that there were no disturbances of nutrition nor of digestion of any importance to be noticed during the free intervals. How long the tumor had existed, whether it had grown recently only, or whether its growth had any relation to the distressing attacks, could not be ascertained. The firm adhesion to the kidney capsule is probably explained by a weakening of the cyst walls and the digesting process reaching the surface. Such a source of irritation produced the amount of scar tissue found, growing so well that

it had become a part of the capsule, in a mechanical sense. One's imagination need not be stretched much to see actual communication with the kidney system and complications added from this source.

The contents of our tumor were lost. In a very excellent essay by Honigman, describing seventy cases in detail, we find the cystic fluid clear fifteen times, turbid twelve times, but most frequently it was red. In our instance it was a very bright red, like normal blood. The reaction was usually alkaline, the specific gravity from 1010 to 1020, only once 1060. An almost constant finding was a rich albumin content; of sugar, only traces were found. Blood was met with in many cases, the corpuscles, both white and red, being more or less changed. Frequent, also, were large granular cells, and cylindrical epithelium and granular elements. The ferments, though diagnostic, are only reported in half of the cases (Ipsen); they were present in three of Honigman's eight patients. Since Sesniowski and Maliniak have been able to demonstrate inactivated trypsin (Ipsen), there may be more cases showing this ferment in the future. Diastatic and fat splitting ferments were found six times in the Honigman series. The presence of trypsin is considered pathognomonic, though traces of it, some writers think, are derived from leukocytes. The absence

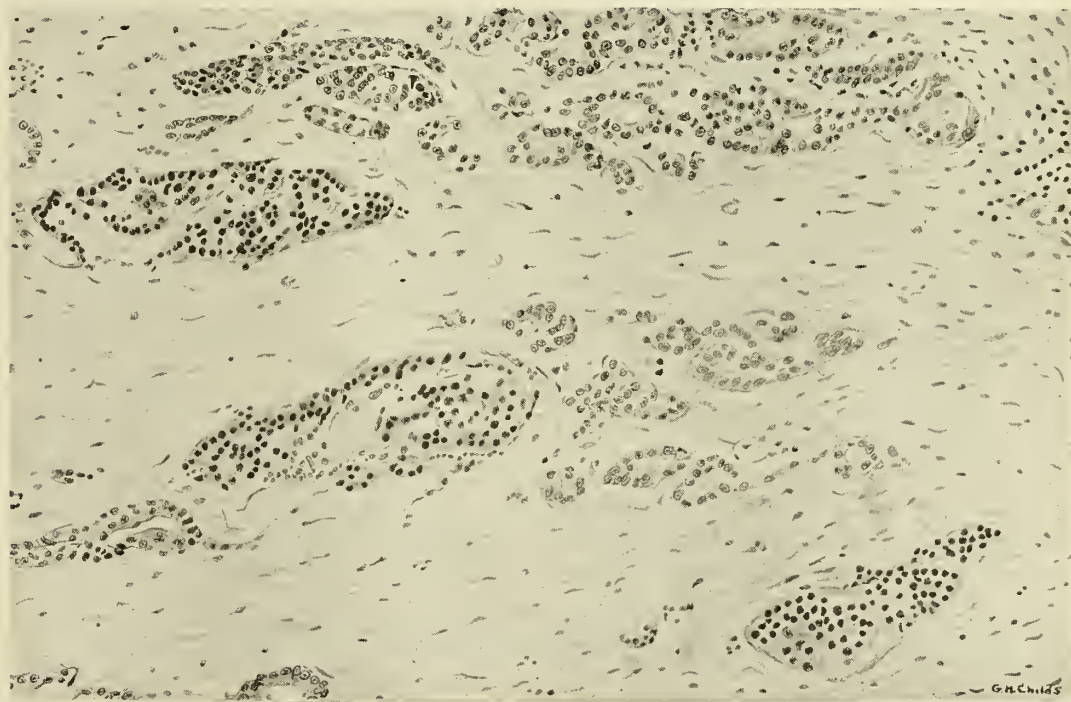


Fig. 4. Microscopic section of case reported showing crypts of acini and island of Langerhans.

of this ferment may be caused by the admixture of blood, as Boruttau believes, since it was found, after operation, draining from the fistula. The pancreatic origin is proven by the presence of the three ferments. The finding of steopsin is of greater moment than amylopsin, both making the diagnosis reasonable. In relation to the examination of the cystic fluids we refer to the well-described case of Schwarzkopf. Drawings made of sections of the wall of our tumor show the glandular origin of the growth. A duct is seen lined with cuboid epithelium. Heavy connective tissue trabeculae pass away from the dense periphery and in this network lie masses of epithelial cells in irregular saccular and tubular arrangements constituting the diagnostic proof in our case. Evidence of necrosis, such as poorly tintured elements, is not pronounced.

The location of the cyst in this case was not only fortunate for the patient, being chiefly responsible for the happy result, but was also exceptional. There are only three of these in the Honigman series, including his own. Among other growths in the region to be mentioned are the aneurysms of the renal artery, which may appear soon or even a long time after injuries, such as result from a horse kick in the abdomen, or from squeezing between cars, or from being run over. They attain considerable size, are globular, indistinctly fluctuating, do not move with respiration and can be displaced but little. Their growth may be painless, but usually there is severe pain immediately following the insult. They are silent to auscultation on account of the small size of the artery, but invariably give rise to hematuria, it being, as a rule, the first symptom. This may disappear in a few days or continue for months, and again may be intermittent (Honigman). There are thirteen cases reported by Keen and nineteen by Morris. Unilateral hematuria was a complication in Honigman's cyst, and in the case of Ransohoff. The retroperitoneal lymph and chylus cysts (Elter) and the retroperitoneal sanguineous cysts (Fisher) are usually differentiated from pancreatic cysts with the aid of the laboratory. Some authors believe that many of Fisher's tumors were of pancreatic origin. In rare instances, adrenal tumors present in this region, and following injuries large hematonephroses may develop. Hydronephroses make their début a long time after a trauma and they are very rare (Kuester). There are a few cases reported in which the tumor appeared in the right lumbar region.

Between the ensiform process and the umbilical horizontal is by far the most favored location, as is demonstrated in the series of Koerte and of Honigman and other writers. The cyst usually grows into the bursa omentalis and bulges forward between the stomach and colon. It may also come out, but less frequently, above the lesser curvature, pushing up the gastrohepatic ligament as its ventral wall. A third possibility is its growing between the layers of the mesocolon, so that the transverse colon is slowly made the cupola of the tumor. The mass is compared to an air cushion (Seefisch) and does not reach lower than the umbilicus. Direction, shape and size of the growth is modified in the event of the neighboring organs being changed or adherent in one way or another, so that the stomach itself may be the frontal wall. In Philip's case, the whole abdomen was prominent, resembling ascites. Compression of the aorta may easily occur, giving rise to murmurs, so that a diagnosis of aneurism becomes a possibility. In the former condition the vessel may often be released by a change of position, diverting the weight of the tumor and the sounds disappearing (Pepper), while the latter remains unchanged, effecting great pallor and venous engorgement of the face and weakness of the radial pulse. There are instances reported in which it was impossible to rule out one or the other. Chauffard writes considerably about the hydatid cysts of the left lobe of the liver in this connection. In such cases one can, as a rule, demonstrate a compensatory enlargement of the right lobe and there are no murmurs. Inflammatory changes and swellings of the gallbladder must be mentioned. Here it is well to remember that icterus with a pancreatic cyst is very rare, Honigman relating one case. If the mass is more to the left, splenic tumors come into the range of consideration. The cysts of the mesentery are usually below the umbilicus and are freely movable. The peritoneal sanguineous cysts and the bloody effusions into the great omentum are almost impossible to distinguish from pancreatic cysts. Circumscribed peritoneal effusions and empyemata have caused difficulties in some instances. Chauffard mentions an ovarian cyst with a long pedicle.

If we were able to divest the cysts of the pancreas from the phenomena of associated disease of adjacent and related organs—the stomach, the biliary and the hepatic system (Judd reporting seventeen cases of gallbladder in forty-one, and Ipsen

about forty per cent in his series from the Rovsing clinic) and of the great vessels—or of the signs of morbid change in the reticuloendothelial system, of which the pancreas is a member, or of the symptoms of lack or loss of function of the organs encroached upon, displaced and depressed by the growing tumor, or from the diminished activity of the gland itself, we would fail to find a single sign which might be called pathognomonic. In our case a diagnosis was not made, though the peculiar paroxysms of pain and distress approaching shock, increasing in severity as the duration of the disease lengthened, should have led us to better understanding. Many writers have judged their cases correctly and taking the symptom complex as a whole there are usually sufficient characteristic features about the disease. In a typical instance, the patient being usually of adult age, the upper abdomen has met with a violent trauma and signs of shock are often present. At a variable period of time (two weeks to eight years, Honigman) there comes to be noticed a tumor in the epigastrium, globular and fluctuating. It is separated from the liver by a zone of tympany and difficult of being differentiated from the splenic dullness. Gussenbauer was the first to determine the relative position by insufflation of the stomach and colon; Albu gave an excellent illustration of the value of modern roentgenology showing to what extent the upper digestive tract had been displaced or distorted—both methods proving that the growth is situated behind the stomach, unless concomitant disease such as previous perforation and perigastritis interfere. In addition, many patients have lost weight, have grown increasingly weaker, and in varying degree suffer from cardialgia, colics, disturbed digestion and nutrition, and from constipation. In a few cases there were suggestions of impaired pancreatic function as evidenced by polyuria, glycosuria and the finding of fat and undigested muscle fibres in the stools. The tumor may disappear in some cases, or diminish in size and then grow again. While many patients have looked ill, poor in flesh and dejected, with a sickly yellowish pale complexion, our case appeared rosy, strong and a picture of health and felt well, but for the attacks of pain and distress in the upper abdomen, the sensation of a prying wedge, palpitation and dizziness. The same symptoms are rarely missing in the cases reported, usually occurring in paroxysms, being sometimes of great severity and then expressed as

sensations of heavy fullness and of distressing pressure in the stomach. In the majority of instances the symptoms increased after food. One may think of gastralgia, of gastric and duodenal ulcer, of hepatic colic and of tabetic crises, but all things considered they are different. Chauffard, who discusses the symptomatology under two headings, namely, “the period before the tumor and the period with it,” names the initial syndrome of distressing pain “the syndrome pancreatico-solaire,” assuming the solar plexus to be the bad and sensitive neighbor. Most writers believe the exacerbations of acute pancreatitis followed by the activity of the ferments effect expansion of the growth and cause the symptoms. In the opinion of Chauffard, the attacks are so frequently present and so characteristic that they become of great value both for diagnosis as well as for prognosis in differentiating from cancer, in that they are less severe and much later appearing in the latter. Of all the abdominal cysts, the pancreatic is often the most painful. The exploring needle used for diagnostic purposes in the past has been abandoned, there having occurred some discomforting experiences and the findings having proven of little value.

The pancreatic cysts present very often a complicated clinical picture. It may be impossible to tell their origin at operation, and, indeed, not even by microscopy. Not everything diagnosed as pancreatic cysts has been such. Their growth is very uncertain and pregnant with complications. A painstaking diagnosis is a necessity, for if the gland has suffered considerable loss the prognosis cannot be good, though the operation be well borne and successful.

A spontaneous cure by watchful waiting is not known. The contents may discharge into an adherent hollow organ. Under favorable conditions, the perforation heals, the cyst again refilling continues to expand, but often peritonitis ends the story. Serious hemorrhages into the cyst and purulent change of its filling can be expected, and, last but not least, the rapid and continued losing of weight and strength demands a speedy removal of the malady. Theoretically, the ideal method is that of extirpation. This may be followed by prompt healing, as in our case, and by reasonable freedom from recurrence and hernia, since the wound may be closed at once. In Judd's cases it was done five times; in Honigman's, twice. The proliferating

cystadenomata allowed complete removal far better than the digestion cysts. A tumor whose capsule is extraordinarily vascular and fragile and densely adherent is difficult of enucleation. When its capsule is made up to a greater or less extent of the adjacent vital organs it cannot possibly be removed.

We do well, therefore, to consider such signs as immobility, size and location, and pronounced symptoms of the organs interfered with. Gussenbauer (1882) first employed the method called "marsupialization," sewing the cyst wall to the skin and draining off the contents. This was done for sixty-nine of Honigman's and thirty-one of Judd's patients. From results obtained, it has become the normal practice. Generally the situation is attacked from in front, and when the capsule lies close to the skin or is easily brought to it the difficulties are slight. On the other hand, the cysts may be deep-seated and small. In such instances it is recommended to sew two strips of gauze to the capsule and pass the catheter in between through a small opening into the growth, closing the hole, if possible, with omentum. Formerly the operation was done in more than one step, but hemorrhage and injury to the stomach or intestine brought about by going blindly have made the one-time method come to stay. The contact of the uninfected contents of the tumor with the peritoneum was formerly more feared than now, so that we do not choose the lumbar route chiefly because it is extra-peritoneal. Only if pus is suspected or if the growth lies laterally or too deeply, or if the kidney cannot be ruled out (the diagnosis being clouded in this respect) is the lumbar incision demanded. Judd reports no death from operation, Honigman reports three. The duration of recovery varies greatly from weeks to months and years. In this respect it appears that the digestion cysts with their purely connective tissue lining do far better than the epithelial-lined retention cysts and cystadenomata. Some patients having shown albuminuria or polyuria and glycosuria before and soon after operation have not done well. The pancreas was damaged. The danger of a hernia should not discourage anyone who presents a pancreatic cyst, when his chances of turning an otherwise most unfavorable outlook into a bright one by surgery are good.

A valuable contribution to postoperative management has been made by Wohlgemut, in preventing

the digestive activity of the secretion coming from the fistula. Following Pawlow's experiments with the dog, he found that the secretion of the pancreas in man was likewise dependent upon the kind of food ingested. After he had instituted a strict anti-diabetic diet in his cases the drainage diminished rapidly and healing took place much more promptly. Some cases, however, did not respond. Upon closure of the fistula he takes eight days to slowly return to a normal diet, giving one teaspoon of bicarbonate of soda one-half hour before and after food. Lazarus advises in the traumatic cases a few weeks of absolute rest in bed under observation and believes that thus cyst formation may be prevented.

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DISCUSSION

DR. ARNOLD SCHWYZER, St. Paul: Dr. Bouman has given us a carefully observed case, with a good history of a traumatic cyst of the pancreas, such as we could hope for from him. According to the literature, there are practically no traumatic cysts of the pancreas that are removed. They are considered too large, are surrounded by blood vessels, and too extensive for removal, and marsupialization, as he mentioned, has been done. Marsupialization is a term that was introduced by the French. Where marsupialization has been done in these cases, the results, as a rule, have been good. The only danger is that the sac may not close. We may have a very large sac in the young, but very large sacs shrink down comparatively rapidly to little fistulas. The fistulous tract may cause trouble by suppuration or even

sometimes bleeding later on. As a rule, these sacs shrink down rapidly.

I have recently opened such a cyst and swabbed it out with strong iodine and strong formalin, expecting it to close and stay closed. As long as we are on the treatment, I might mention that sometimes puncture of the cyst alone will cure the case, but it is a procedure that should be condemned. I refer to puncture alone through the abdomen. I remember one case which was literally loaded with a large cyst; I had to approach it retroperitoneally; I got into the peritoneum; I closed it up, and I thought for the present I would just puncture it and let out the contents. I was very careful; I had the cyst in my wound, and put in a small trocar and emptied it. It took a long time for the thing to fill up again, so that I finally lost track of the patient. I watched her for a long time, and it did not fill up again, but stayed well. The wound healed up. Sometimes, when we are lucky, the main opening may do that. Extirpation is the real thing when you have one of these cysts. We are more acquainted with tumors, and I might include them with tumors of the ovary and pancreas. If you have a retention cyst it is the same as a Graafian follicle, while a proliferating cyst is thick walled. Usually there is one cyst made up of small sized cysts.

DR. WARREN A. DENNIS, St. Paul: This is a most interesting paper, and as is usual with Dr. Bouman's it is thoroughly worked out. I would like to add to his classification dermoid cysts of the pancreas.

Last February I had occasion to examine a young man who had a mass to the right of the median line which showed clearly with the x-ray, there being calcification in its wall. It was about the size of a large grape fruit. X-ray examination showed that the duodenum apparently ran in front of the cyst. It was undoubtedly a retroperitoneal cyst, although we did not make this definite diagnosis. Incision showed, as far as we could determine, that clinically it was a cyst of the pancreas. It was approached first from above the stomach, and we found a thin layer of pancreatic tissue between the stomach and cyst wall. Effort was then made to approach it from the gastrocolic omentum by lifting up the colon and stomach. Here a thin wall of pancreatic tissue presented. An effort was made to reach it from the right side so that we would not have to go through pancreatic tissue. The duodenum was elevated, but there was pancreatic tissue between the finger and cyst wall. We went in just above the stomach. About half a centimeter of pancreatic tissue had to be divided to reach the cyst wall. The location was such that it did not seem advisable to attempt to remove it. The superior mesenteric vessels were distorted to the right and in front of it, with the portal vein just above it, the hepatic artery and common duct just to the right. It did not seem wise to attempt to dissect it out, consequently it was opened and found to be a dermoid cyst, which contained the typical characteristic contents of such cysts. It was marsupialized in the manner described by Dr. Schwyzer, and eventually it may close. We have taken x-rays of this cavity from time to time; it still discharges. The discharge is of a purulent watery nature. Sinuses resulting from the drainage of dermoid cysts are most persistent. Our efforts directed toward the closure of this one have thus far failed.

SURGERY IN INFANTILE PARALYSIS*

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Infantile paralysis, or acute poliomyelitis, strikes without warning, both by epidemics and endemics, and leaves in its wake many tragedies. Children are most commonly affected and when one sees, day after day, the little cripples that are brought to orthopedic clinics one can readily understand the anxiety, bordering on terror, that comes to parents during an epidemic. It is no less sad to see adult persons who, a few days before, were strong and robust, left helpless invalids.

During the acute attack a serum should, if possible, be given, for sufficient data have been presented by Rosenow to show that it probably lessens the number of epidemic cases in which paralysis develops and seems to reduce the extent of the paralysis in persons who become paralyzed. During this stage the treatment is essentially medical. Following the acute period, paralysis becomes evident and there is soreness and pain in the affected parts. Splinting should be instituted in order to maintain the part in physiologic rest and thus prevent deformities; as soon as the soreness leaves, gentle massage should be instituted. Electricity, though widely used, is of no value, but if muscle training is given under proper direction during the period of recovery, it is of great value. For weeks and months, or even years, there is usually improvement, the degree depending on the extent of the cord involvement. Finally, a period is reached when the maximum of recovery is attained and the patient is left with a definite permanent residual paralysis. This marks the time for the consideration of surgery. No arbitrary time limit can be set, but as a rule this stage is reached in eighteen months. Of 1,774 consecutive patients with residual paralysis following poliomyelitis seen in the Orthopedic Section of the Mayo Clinic, only 25 per cent were subjected to surgery. Some had such good function that improvement was not attempted, while others had such extensive involvement that there was nothing with which to work.

I shall discuss, in synopsis, the various types of

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operations that have proved to be of value, and point out the general indications for their use. The deformities that follow poliomyelitis are the more lamentable in that practically all could have been prevented by proper splinting. The chronicity of the condition, however, the general well-being of the patient, the absence of pain, and the insidious development explain partially the apparent indifference of the parents to the advance of these abnormalities. Deformities in the lower extremities, with a consequent poor weight-bearing line, are the most common. The paralysis is usually partial, some muscles retaining at least a portion of their

that the hip and abdominal lameness will not be materially affected by the remedy of the condition existing below."

Manipulations and tenotomies.—Persistent daily manipulations and stretching of muscles with the application of a suitable splint to hold each gain will often correct deformities. However, in many instances the patients come from the outlying districts and cannot stay long enough to submit to this somewhat tedious treatment. Under such conditions the forcible correction of the deformity under an anesthetic is permissible. In case of deltoid paralysis the arm is held adducted to the side, thus mak-

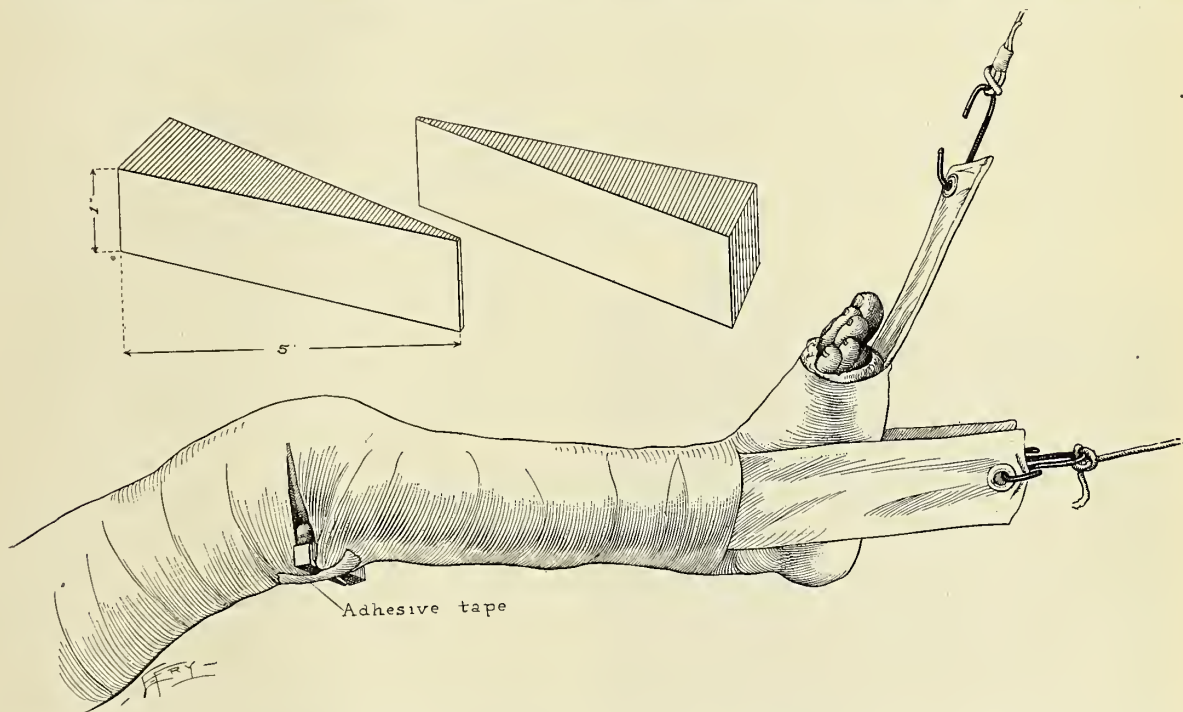


Fig. 1. A method of wedging the cast to straighten the knee, combined with moderate extension on the cast.

power. Their opponents, being entirely paralyzed, do not maintain the normal muscle balance; the partially paralyzed muscles contract and thus produce the deformity. Gravity itself is by no means a negligible factor. The selection of cases for operation is an extremely important procedure. I shall not attempt to discuss this here, but will quote a paragraph from one of Lovett's papers:

"All operative procedures should be undertaken only after a careful study of the gait, that is of the case as a whole, and operations upon the thigh and leg should not be undertaken in the presence of severe involvement of the hip and abdominal muscles, without warning the parents, or the patient,

ing it necessary to force the arm into abduction; the position gained must be maintained by a suitable splint. A muscle, so stretched, will often regain considerable power on being relaxed. Mild flexion deformity of the hip can be corrected in the same manner. When the knee is flexed the attempt at correction must be carefully made, or subluxation may be induced. The knee must be straightened only so far as is possible without danger of subluxation. The surgeon should apply a cast with the knee at that angle. After a week or ten days the process may be repeated. The wedging method is also useful; a split is made in the cast transversely in the popliteal space and wooden wedges

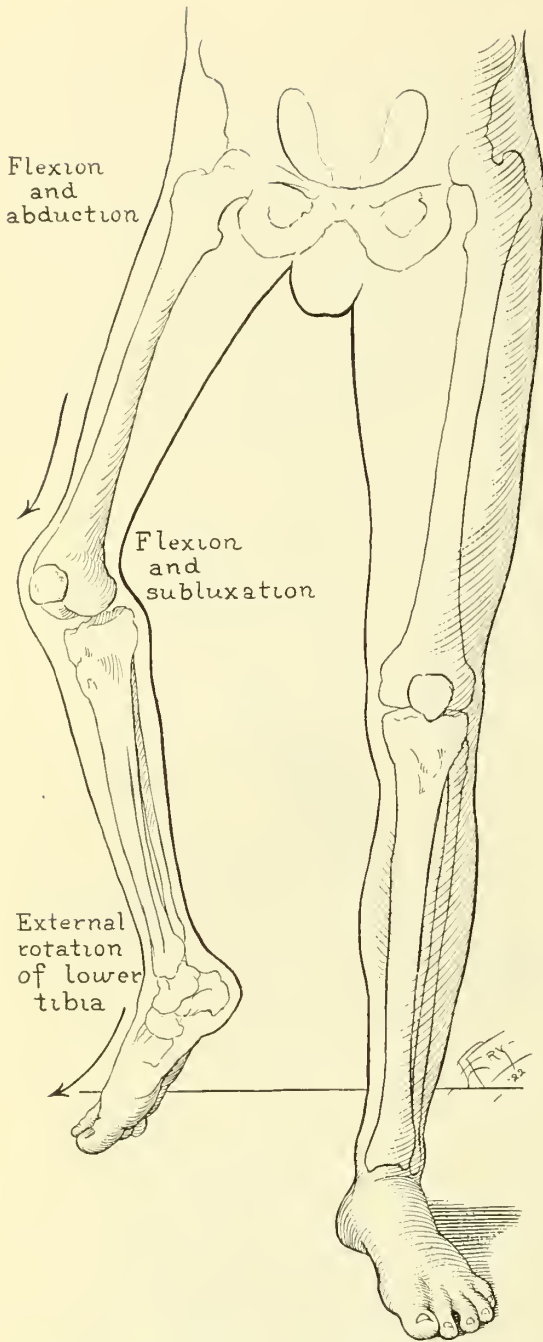


Fig. 2. Diagrammatic representation of common deformities of the lower extremities.

inserted (Fig. 1). By increasing the size of the wedge each day the knee will gradually straighten and the close fitting cast prevent any tendency to subluxation. Mild equinovarus deformities of the foot may often be corrected by manipulation and the position held by a cast.

Tenotomy is usually employed in connection with manipulation, but should not be performed until everything possible has been accomplished by ma-

nipulation. This is best illustrated in the correction of talipes equinovarus, when, if the tendo achillis is cut before the varus is corrected, the fulcrum action of the latter is lost and correction of the varus by manipulation becomes very difficult. After the most has been accomplished by manipulation, however, the tightened ligaments or tendons are divided. The tendo achillis and the plantar fascia often require tenotomy.

Osteotomies.— In the feet, particularly, osteotomies are often necessary after the maximum of correction has been obtained by manipulation and tenotomies. In a flail lower extremity, if the hamstrings are not completely paralyzed and the extensor fascia femoris has still some power, the deformity is more or less typical (Fig. 2). The thigh is flexed and abducted, due to the action of the extensor fascia femoris. The knee is partially flexed, and possibly subluxated. The pull of the hamstrings and the extensor fascia femoris on the tibia and fibula causes flexion with a tendency to subluxation and an outward rotation in the leg below the knee, the tibia itself finally taking on this rotation. Even though the hip is straightened, most readily by the Soutter operation or some modification of it, and the knee also straightened, there remains a marked eversion of the foot and a tendency to knock-knee, due to this rotation. This can, in many cases, only be corrected by an osteotomy through the lower end of the femur and one through the upper one-third of the tibia, and possibly through the fibula, after which the foot and lower leg are rotated into normal line. This has been forcibly brought to our attention by Michael Hoke. The Soutter operation, whereby the extensor fascia femoris is stripped off the ilium at its origin, and the deep structures, even the capsule of the hip joint, are divided, corrects the flexion and abduction of the hip. Talipes equinovarus is not infrequently present and osteotomy through the tarsal bones, with removal of a wedge, is often necessary. Faulty posture and line of weight-bearing, owing to some skeletal deformity, even in persons with normal muscles, are fatiguing. One can readily appreciate how quickly the person who is partially paralyzed will tire, if the line of weight-bearing is not correct, when the weak muscles are called on to maintain the body in the upright position.

Correction of the line of weight-bearing in the lower extremity puts the muscles that are not com-

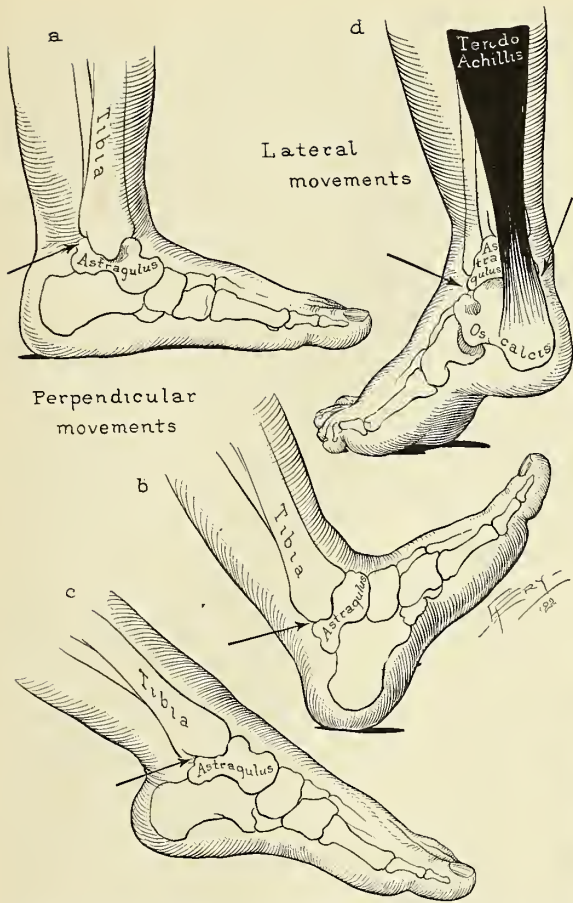


Fig. 3 (a, b, and c). Diagrammatic representations of flexion and extension of the ankle joint. (d) Shows where lateral mobility occurs.

pletely paralyzed in a more favorable position to do their work. It is surprising to what degree function will be restored, and how readily patients will learn to use the small amount of power that remains in these muscles to much greater advantage.

Arthrodesis.—The object of surgery in infantile paralysis is to increase function in and to give stability to the weight-bearing extremities, and to increase function in the upper extremities. Arthrodesis should be undertaken only when the joints below the joint to be fixed are in proper position for weight-bearing and when there is enough musculature to enable these parts to share in the weight-bearing. If the leg is flail and ankylosis of the hip is induced, and if the knee and ankle are deformed and incapable of bearing weight, arthrodesis is of little use unless the patient can learn to use a brace that will give stability to the knee and foot. Moreover, the occupation and character of the patient must be taken into consideration, for many per-

sons will uncomplainingly endure the inconvenience of a brace throughout their life, rather than have a stiff knee. On the other hand, a person who has good power in the hip and poor power in the knee might prefer to have a stiff knee and to be rid of the inconvenience of wearing a brace, particularly if they are engaged in outdoor pursuits. Arthrodesis of the ankle joint is not, as a rule, satisfactory; astragalectomy is generally the more useful operation.

The movements of the ankle joint itself are only dorsiflexion and plantar flexion (Fig. 3, a, b, c). The lateral mobility occurs at the astragalocalcaneal joint (Fig. 3, d), and arthrodesis of this joint, after the method of Davis, is an excellent procedure in certain cases, but it is not a complete substitute for astragalectomy. Many patients with practically flail feet can get around very well if this lateral instability is corrected by arthrodesis. The tendency for the front part of the foot to evert, so



Fig. 4. Showing ability to raise the arm from the body following arthrodesis of the shoulder joint.

often seen in patients with flail feet, can be remedied to a certain extent by an astragaloscaphoid arthrodesis.

In the upper extremities, arthrodesis of the shoulder joint is only to be undertaken when the scapular muscles are intact. If these are normal, or nearly so, the patient can voluntarily raise the shoulder, and at the same time bring up the arm from the side. This operation is satisfactorily employed even when the muscles surrounding the elbow joint are paralyzed, because the patient can learn to raise the arm from the side and then allow the hand, by action of gravity, to drop to the head, so that it can be used to wash the face, comb the hair, and so forth (Fig. 4). If the hand is paralyzed, however, it can readily be seen that there is no object in performing this operation.

The elbow joint, when flail, may be ankylosed in the position of election, usually approximating a right angle, but as a rule patients have learned so to handle themselves that they are reluctant to have an ankylosing operation performed on the elbow. Often total paralysis of the hand is present with the flail elbow and this prevents the use of the forearm.

Plastic operations on the tendon.—The literature of recent years has been filled with descriptions of plastic operations on tendons. It is a fascinating phase of surgery, and it is marvelous to see a tendon, which has previously been a flexor, develop

into an extensor. Tendon operations have been too freely employed in the past, but better judgment is gradually being used in the selection of cases, and, although fewer operations of this type are being done than formerly, results are much better.

The foot offers the best opportunities for the transference of tendons, but even here the field is limited. So often the patient has a dangle foot in which there is absolutely no opportunity for a plastic operation on the tendons. If, however, the patient has a paralyzed tibialis anticus, and the peroneals are strong, a transference of one of the peroneals to the tibialis anticus is of benefit (Fig. 5). If the patient has a paralyzed peroneal group, and a strong tibialis anticus, transference of the tibialis anticus to the outer side of the foot, inserting it into the cuboid bone, yields an excellent result. The transference of the peroneals into the tendo achillis, and the transference of the extensor longus hallucis into the front of the foot, the former to act as a plantar flexor and the latter as an extensor, have usually been, at least in my experience, disappointing. There is a physiologic limit to the work that a given muscle is able to perform and when more than this is required, failure is certain; it is not logical to transfer the tendon of a weak muscle to the insertion of a strong one and expect it to do the duties of the latter. If the quadriceps extensor of the knees is paralyzed and the hamstrings are normal, the transference of the biceps (Fig. 6), and occasionally the semitendinosus, into the patella is a very satisfactory operation. Although the patient is not able to extend the knee fully, it does give stability. In the upper extremity there is very little opportunity for tendon transference. Steindler has been doing some work on the fingers that promises well, but as the opportunity for its application, at least in infantile paralysis, is rare, definite information with regard to its usefulness is not at hand.

Tenodesis, as advocated by Gallie of Toronto, is an important procedure. It is possible to prevent footdrop by suspending the front part of the foot by implantation of the distal portions of the paralyzed extensors of the toes, and the tibialis anticus into the tibia. In certain selected cases the implantation of the tendo achillis into the tibia will assist in preventing calcaneal deformity. A criticism offered is that, following this procedure, marked deformity may develop during growth, but I see

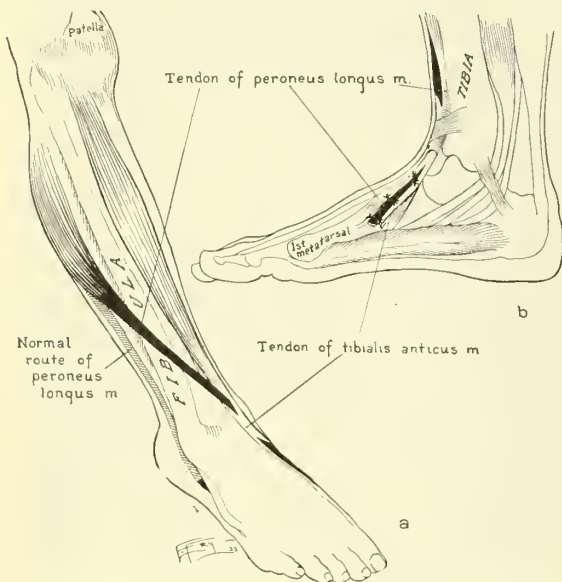


Fig. 5. Transference of the peroneus longus to the tibialis anticus, also showing method of insertion.

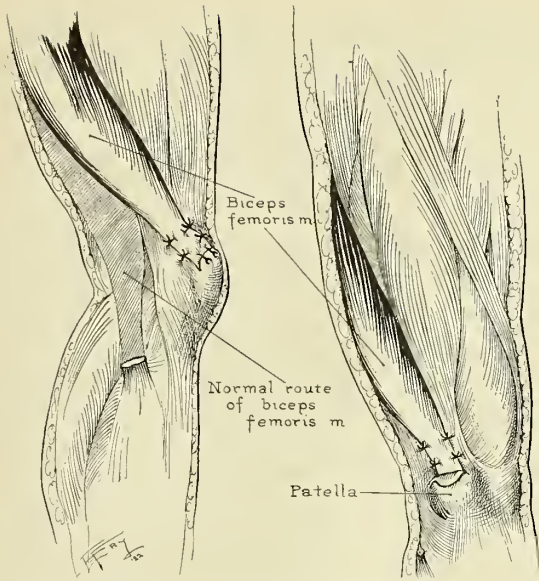


Fig. 6. Transference of biceps femoris to the patella. Showing method of insertion.

no reason why, if this were the case, it could not be very readily corrected by a tenotomy. On the whole my use of this operation has been rather disappointing, because so often the tendons have slipped at their insertion in the bone; in a few cases, however, it has been very satisfactory. It may be that in some cases the technic has been faulty, but even when the procedure was carefully carried out, failure was too common, and any operation in which the percentage of failure is so high is rather questionable.

Astragalectomy with posterior displacement of the foot.—Astragalectomy, advocated by Royal Whitman for many years, is one of the most useful operations that we have at our command. To sacrifice bone in an already shortened extremity seems at first thought a poor procedure, but the increased stability imparted more than compensates for the loss. The foot is improved in appearance and, in fact, I have often been astonished when the patient came back for examination to find that a foot which appeared so nearly normal had been subjected to astragalectomy. It is indicated chiefly in the calcaneovalgus deformity (Fig. 7), although it may be used to advantage in many cases of flail feet. Two points are to be remembered when performing the operation and are of paramount importance. First, the foot must be pushed backward on the tibia so that the line of weight-bearing will be transmitted more nearly to the center of the foot; second, the

foot must also be put in slight equinovalgus so that the weight-bearing line will be a little to the inner side. If these two essentials are not carried out, the patient may be worse off than he was before and a good operation discredited. The foot should be put up in a plaster of Paris cast and held in position for six weeks.

SUMMARY

Surgery is indicated only in the residual paralysis following poliomyelitis and only about 25 per cent of such patients can be helped by surgical procedures. As a rule manipulations precede tenotomies, and manipulations with tenotomies, osteotomies, the last named being resorted to only for correction of skeletal deformities. Arthrodeses are occasionally indicated but should be performed only after a careful consideration of the power left so that the patient may use the fixed point to advantage.

Lastly, but by no means least, the social status and the habits of the patient are to be seriously considered. Plastic operations on tendons are useful, but are applicable in only a small percentage of cases. A weak muscle must not be expected to do the work of a stronger muscle, particularly when it is placed in a new position and is usually at a mechanical disadvantage. Astragalectomy is the operation of choice for calcaneovalgus and in cer-

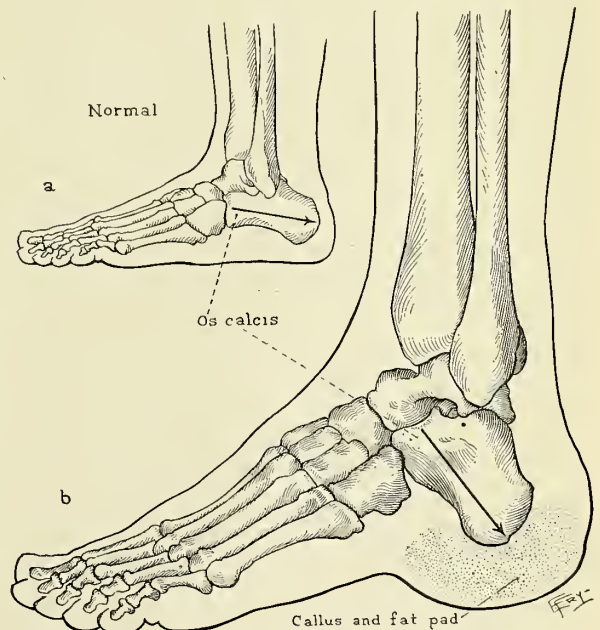


Fig. 7. Diagrammatic representations. (a) Normal foot. (b) Calcaneal deformity.

tain other conditions, but should always be accompanied by a posterior displacement of the foot.

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DISCUSSION

DR. EMIL GEIST, Minneapolis: I think it is necessary to devote a little attention at this time to the surgical treatment of infantile paralysis when we consider the epidemics which have ravaged the northwest within the past ten years, leaving a great many children and young adolescents with greater or less permanent paralysis. The surgery which you have seen and heard about today is important surgery in connection with infantile paralysis. It is really the last thing that can be done for these cases, because we do not think of operating on these children until two or three years after the onset of the paralysis. The deformities at that time they should have presented may not exist in some cases. Deformities ought to be corrected. The object of operation is to give a new function, a new motion to a joint that has been lost. We can do that provided the degree of paralysis is not very great by means of tendon transplantation, but as Dr. Henderson has pointed out, the field for this is not as great as we thought it might be ten years ago.

Then comes the operation of dealing with bone that is affected, and one of the great objects of operation is to relieve the patient from wearing unsightly braces. These braces get out of order, they are expensive, and have to be changed right along. We can usually, if we know how much paralysis has definitely occurred, relieve the patient of wearing a brace by giving him a useful member, or leg on which he can walk without a brace. This of itself is a great relief to the patient. These operations, if they are done at all, should be performed after careful study

of the cases, and each case is a law unto itself. There is no definite rule which can be laid down to apply to all cases. The cases must be studied carefully and treatment applied to the individual case as indicated.

I wish to thank Dr. Henderson for his excellent paper.

DR. WALLACE COLE, St. Paul: I think Dr. Henderson has shown one thing very clearly by his paper, and that is, the number of operative procedures that can be utilized in infantile paralysis is decreasing rather than increasing. In the past ten or fifteen years there was a certain time when every case had to have something done to it in an operative way. We are seeing the end results all the time; cases are being admitted to hospitals with scars where various operations have been done in the attempt to stabilize or transplant tendons without any effect. Recently things have quieted down, so that now operative procedures are undertaken only where definitely indicated as shown by Dr. Henderson. One of the reasons for bad results from operative procedures is that the deformity is corrected and at the same time the stabilizing operation is performed. We must remember that some of these paralyzed muscles which have been on a stretch will regain power if put at rest and relaxed by putting the part in good position. There should be a period of several months during which active physiotherapy is used before other operations are employed.

In tendon transplantation the results are very satisfactory in the relatively few cases where it is indicated. The transplantation of the biceps to the patella is satisfactory in my experience, although it takes a long time for the power to come back. A few weeks ago a girl came back to the out-patient department, who had been operated on a year ago and was discharged wearing a stiff knee brace, with absolutely no power in the transplanted biceps. She was able to actively extend the knee with that biceps. A few months following operation is not enough to tell us whether the operation is successful or not.

After all, in the foot, astragalectomy is the operation we are falling back upon more and more. The other types of operation are indicated more rarely as we go along, and often astragalectomy is satisfactory regardless of the general type of paralysis present. If you see a foot a year after an astragalectomy, it is almost impossible to tell what has been done, unless you see the scar, because the cosmetic results are almost perfect.

DR. M. S. HENDERSON, Rochester (closing): There is nothing in particular to speak of except to thank Dr. Geist and Dr. Cole for their discussions. It is worthy of emphasis that there are a lot of paralytics not only in the northwest, but all over this country, which can be relieved by operative procedures. Deformities should be corrected by proper splinting and other measures which we carry out. The selection of cases is important. As Dr. Cole has pointed out, we are doing fewer operations now on cases of infantile paralysis than we did ten years ago, but our results are correspondingly better. In cases in which we resort to tendon transference some of the results are good and others are imperfect. We should have a definite knowledge of what is good and what is not, and the operations I have mentioned today are all worthy of trial.

THE VALUE OF THE ROUTINE DETERMINATION OF BLEEDING AND COAGULATION TIMES UPON NEW-BORN INFANTS*

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Melana Neonatorium, or "Hemorrhagic Disease of the New-Born" as it is more commonly called, is an ever-present danger threatening every new-born infant and presenting a baffling problem alike to pediatrician, obstetrician, and general practitioner. With an insidious onset it attacks infants who have survived the ordeal of birth and have appeared entirely normal until the third or fifth day, when, without any warning, there appear from the mucous membranes or umbilical stump, hemorrhages which frequently go on to a fatal termination. Occasionally these hemorrhages occur over the brain or in the internal viscera, and, in the absence of external signs or an autopsy, the cause of death remains unknown.

During recent years this syndrome has been found to be accompanied by a prolongation of either the bleeding or coagulation time, or both. It has also been shown most conclusively that the subcutaneous injection of serum or, more preferably, whole blood, may stop the bleeding and cause a cure. This has simplified the problem until it is now a question of making a sufficiently early diagnosis to institute treatment before the hemorrhages are extensive enough to prove fatal. This can only be satisfactorily accomplished by making the determination of the bleeding and coagulation times a routine measure upon every new-born infant before hemorrhages have appeared. Such a procedure is very simple and, while time-consuming, will justify the labor involved many times over, by saving the lives of infants otherwise doomed to an early death.

It is difficult to determine just what percentage of new-born infants are affected by hemorrhagic disease, but that it is a very common ailment and a very frequent cause of death has been most conclusively shown. Kaiser¹ quotes Green and Smith as finding it to occur in 1.1 per cent in the Boston Lying-in Hospital, and in .8 per cent in the Rochester General Hospital. But these figures do not include the cases presenting unseen hemorrhages over the brain or in the internal viscera. From the

opening of the Miller Hospital on December 1, 1920, to May 1, 1921, eighty-one infants were born and cared for in the institution, and of these eighty-one, three, or 3.7 per cent, developed symptoms referable to hemorrhagic disease, and of these three, two, or 2.4 per cent, died as a result of the condition.

In the autopsy statistics upon new-born infants, hemorrhagic disease has been found to occupy a prominent position as a cause of death. For example, the author² found that in a series of thirty-six consecutive autopsies performed upon new-born infants dying at the University Hospital, eight, or 23 per cent, presented multiple hemorrhages in the viscera or over the brain,—definite proof of the hemorrhagic syndrome. Additional evidence was given by the clinical notes showing that of these eight, five, or 14 per cent, had presented before death hemorrhages from the mucous membranes and an increased bleeding or coagulation time.

In another series of 200 autopsies performed upon infants dying during the first week of life, the same author³ found that forty-one, or 20 per cent, showed the presence of multiple hemorrhages in the body. Of these forty-one, thirteen, or 6.5 per cent of the entire series, showed the added evidence of clinical symptoms before death. But since accurate clinical data were not available in all of the series, a still higher percentage might have been added to the 6.5. Confronted by such statistics one is impressed by the fact that an early diagnosis would have given an opportunity of saving about 20 per cent of all infants dying during the first week of life. Surely such a possibility makes the routine determination of the bleeding and coagulation times the duty of every hospital having the responsibility of the care of new-born infants.

In the three cases occurring in the Miller Hospital before May 1, 1921, the bleeding and coagulation times were taken after the onset of the symptoms and found to be increased. Subcutaneous injections of blood were given then, but in one case only was it successful in saving the life of the child. In one of these cases where the clinical diagnosis of cerebral hemorrhage was confirmed by the autopsy findings, the administration of blood caused a reduction of the bleeding and coagulation times but did not produce a cure. This was doubtless due to the fact that a large enough extravasation of blood was already present to cause death before the treatment was instituted. The other fatal case

*Presented before the Minnesota State Medical Meeting, Oct. 13, 1922.

showed profuse bleeding from the mucous membranes and all treatment was of no avail. But this child showed evidences of congenital syphilis and the Wassermann reaction was found to be positive upon both the mother and infant.

On May 1, 1921, the routine determination of bleeding and coagulation times upon every new-born infant was instituted at the Miller Hospital and by April 1, 1922, 250 infants had been subjected to the tests. The method employed was that described by Rodda⁴ in 1919. The apparatus consisted of an automatic lancet with an adjustable blade that could be set at the desired depth and would give a small incision instead of a puncture wound (Fig. 1); two watch glasses 1.5 inches in diameter; a No. 6 lead shot; and a stop watch. The glasses and shot were cleansed with soap and water and carefully dried, while the lance was cleansed of all blood and sterilized by immersion in 95 per cent alcohol for several minutes. The baby's heel was wiped with alcohol and dried thoroughly and the lance blade was set at a distance deep enough to insure a free flow of blood from the incision. On no account was the heel squeezed, as this would cause an admixture of tissue juices which would affect the coagulability of the blood. As the first drop of blood appeared the stop watch was set, the drop quickly and lightly wiped away with cotton fibers, and the second drop deposited in the center of the watch glass, the lead shot placed in it and another watch-glass inverted over it to prevent drying or mixing with lint or dust. Then every half minute the watch-glass was tilted gently until the shot was firmly fixed in the clot, when the time was noted and recorded as the coagulation time. During this period the observer was also lightly wiping away with cotton fibers each drop appearing from the incision, being careful, however, not to apply any pressure. When the blood ceased to exude the time was noted and recorded as the bleeding time.

This method is, of course, open to criticism in that the coagulation time cannot be accurately determined from the peripheral blood because of admixture with tissue juices. However, as Rodda has pointed out, it is the relative and not the absolute coagulation time that is necessary. Prolongations of coagulation are usually definite enough to be easily discernible with any method, and, as will be brought out later, the bleeding time, which offers less variation in the hands of various workers, is

probably more important than the coagulation time. And, while sinus blood may give a more accurate result, a sinus puncture is a much more serious procedure and calls for a much more skilled operator than the heel incision. It is doubtful whether it would be practical to insist upon three sinus punctures upon each new-born infant. But the incision in the heel may be performed with perfect safety in the office, home, or hospital by physician, nurse, interne, or laboratory technician. And since the most practical method is usually the simplest one compatible with good results, Rodda's method is the favorite.

Rodda, as well as other observers, has noted a variation in the coagulation time upon different days of an infant's life, showing a prolongation over the second, third, and fourth days, with a maximum on the fifth day and a drop on the tenth day to that of the first day. Since this corresponds to the age incidence of hemorrhagic disease, it has been suggested that the hemorrhagic disease is only an exaggeration of this normal curve.

In the series at the Miller Hospital the same curve was found but the averages for the normal infants

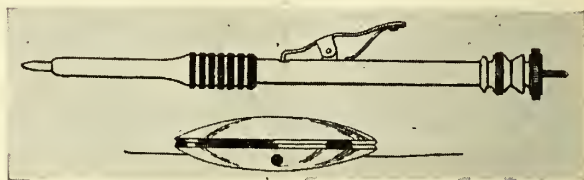


Fig. 1. Apparatus used (Rodda).

were lower than those obtained by Rodda and Lucas⁵. These averages showed for the first day, three minutes and fifty-five seconds; for the third day, four minutes and seventeen seconds; for the fifth day, four minutes and four seconds; and for the ninth day, three minutes and fifty seconds. Some other observers have obtained results similar to these. Thus Shaw and Williams⁶, using a method devised by Dale and Laidlaw, found an average of one minute and thirty seconds; and, using Bogg's coagulometer, an average of three minutes and forty-seven seconds. Fullerton⁷ found the normal to vary from one minute and fifteen seconds to one minute and forty-seven seconds. On the other hand, Rodda found in a series of 126 infants that the coagulation time of the normal cases averaged seven minutes. He checked his method with that of Lee and White⁸ with blood obtained from the superior longitudinal sinus in thirty-eight cases and found

the same average of seven minutes, in spite of the fact that sinus blood usually has a longer coagulation time than peripheral blood. Lucas⁵ found a still longer time by using clean oiled tubes and syringes for the examination of blood obtained from the sinus.

The apparent slight discrepancy between the results of Rodda and this series, although the same method was used, illustrates the individual variation bound to occur in individual laboratories, and shows that each worker must, to a certain extent, develop his own technique and establish his own normals. In this method variations may be caused by the size of the watch-glass, the shot, or the drop of blood. But performed by the same individuals in the new-born ward under the same temperature conditions, the normal cases will give the same averages and any deviations from the normal will be easily discernible.

In fifty of this series a platelet count was made at the same time as the bleeding and coagulation times were determined. The method chosen was that of Ottenberg and Rosenthal⁹ where a 3 per cent solution of sodium citrate was used as a diluent, the mixture allowed to stand for fifteen minutes to permit all the platelets to settle, and the count made with a high, dry lens. The average for the first day was found to be 396,000; for the third, 290,000; for the fifth, 317,000; and for the ninth, 389,000. Lucas⁵ found an average for the first day of 305,000; for the third, 308,000; for the fifth, 295,000; and for the ninth, 318,000. Slavick¹⁰ found that the platelets during the first ten days of life averaged 320,000, and varied from 202,000 to 616,000; Morse¹¹ found them varying from 100,000 to 412,000; Rebaude¹² found an average of 95,000; and Cadet¹³ found them to be 171,000 during the first days of life, increasing to 350,000 by the eighth or ninth days. It seems, therefore, that the results of various observers correspond very well and that there is a diminution of platelets on the third and fifth days when there is a prolongation of the coagulation and bleeding times. But even this reduction does not fall below the normal limits, usually given as between 200,000 and 400,000. In this series it was noted that the drop in platelets usually accompanied the prolonged bleeding or coagulation time and, after treatment, again rose as the bleeding or coagulation time dropped to normal, but here again even these variations were within the normal limits and were considered of no diagnostic value so were

discontinued because the labor involved seemed to give no adequate return.

The method of determining the bleeding time was that of Duke¹⁴ and has been described above. The average for the first day was two minutes and twenty seconds; for the third day, two minutes and thirty-five seconds; for the fifth day, two minutes and thirty-seven seconds; and for the ninth day, two minutes and fifty-two seconds. These results correspond very closely to those of both Lucas and Rodda, who used the same method.

In this study of a consecutive series of 250 infants, the determinations of bleeding and coagulation times were made on the first, third, fifth, and ninth days. After about half of the series had been studied it was noted that in no case in which the blood was normal on the first, third, and fifth days was there an increase on the ninth day, so the last was dropped. The bleeding time was considered normal up to five minutes and the coagulation time up to eight minutes. Of the 250, thirteen, or 5.2 per cent, showed a prolongation of the bleeding or coagulation time, or both, and were given subcutaneous injections of blood before any symptoms occurred. And in eleven of the thirteen, or 85 per cent of the affected infants, the bleeding or coagulation time dropped promptly to normal after the injection of blood. In practically all of these, however, there was bleeding from the incision several hours later. The fact that none of the other 243 infants showed bleeding from the heel, although no dressing was applied, suggests this symptom as an important one in diagnosis; in border line cases its presence or absence determining whether or not blood should be given.

Of the two cases showing prolongation of either bleeding or coagulation time, one case, No. 3297, developed symptoms typical of cerebral hemorrhage, but recovered. The other, No. 1482, was a markedly under-nourished and poorly-developed infant with a thick, leathery skin. The bleeding time on the first day was twenty-seven minutes and the coagulation time twenty-one minutes. There was persistent bleeding from the incision and later hemorrhages appeared from the mucous membranes. Death occurred within twenty-four hours. Wassermann reactions upon both the infant and his father were positive and the autopsy findings were typical of congenital syphilis.

One case of the series showed a normal coagulation and bleeding time, but developed symptoms

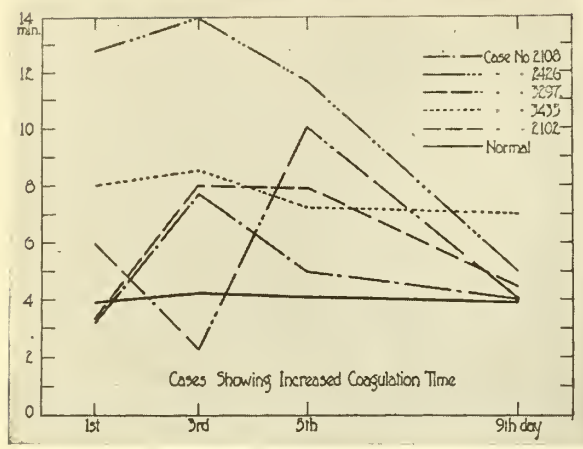


Chart I.

of hemorrhagic disease. This infant appeared entirely normal until the fifth day, when it showed two hemorrhages from the bowel, one of bright blood and the other of a "tarry" appearance. In spite of the absence of findings in the blood, treatment was instituted at once and no further hemorrhages appeared. It is impossible to give any plausible explanation of this. The possibility of the bleeding being due to some local condition is disproved by the absence of local symptoms and the prompt recovery after the treatment for hemorrhagic disease. One must always consider, however, the chance of error on the part of the laboratory personnel in making tests.

One other case with normal blood findings developed signs of cerebral hemorrhage and died, but since the clinical signs were not typical, no visible hemorrhages were present, and no autopsy could be obtained, this was not considered one of hemorrhagic disease.

The cases showing an increase in coagulation time are depicted in a graphic manner in Chart I. It is shown very clearly that each one, even those appearing high on the first day, show an upward curve on the third or fifth days, with a drop to normal by the ninth day as a result of treatment. Of the five showing a coagulation of eight minutes or more, two are high on the first day. The group showing an increase in the bleeding time is shown in a graphic manner in Chart II. In only two of the nine was the prolongation present upon the first day, but in seven there was the typical rise on the third or fifth days. From these curves it becomes apparent that, in order to protect an infant from the possibility of hemorrhagic disease, the

determinations must be made upon the first, third, and fifth days.

In addition to making a diagnosis these determinations are of great value as a check upon the treatment. In each of the cases of this series receiving subcutaneous blood, the tests were performed every day in order to determine the effect of treatment. In the majority of cases one injection of blood was sufficient and the bleeding or coagulation time showed a quick return to normal. However, in a few cases, the elevation persisted or there was a secondary rise after the first fall. For example, Case No. 2102 showed a slightly elevated coagulation time, which persisted from the third to the fifth day, in spite of treatment. Case 1452 showed an elevated bleeding time which dropped to normal very slowly; and Case 1451 showed a secondary rise in the bleeding time, which later dropped to normal under repeated treatment. Cases 1451 and 1452 were of unusual interest in that they were twins and both showed an increase in bleeding time. Case 1451 responded to treatment readily but Case 1452 required several injections of blood, as mentioned above, before the bleeding time was brought down to normal. This infant was

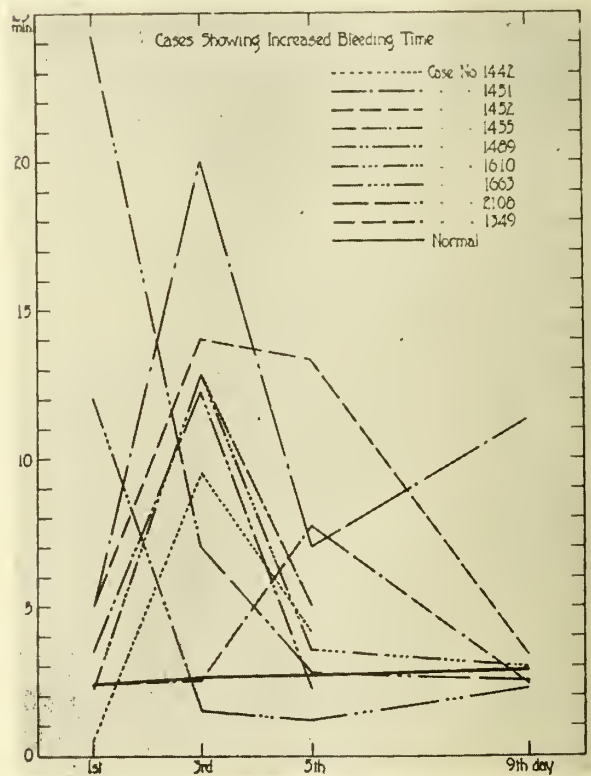


Chart II.

smaller than its fellow and did not thrive in a normal manner. A few months later he was brought back to the hospital with unmistakable signs of congenital syphilis, including a positive Wassermann. At this time he bled profusely and persistently, dying in a few days. The autopsy confirmed the clinical findings.

Upon reviewing these findings, one is struck by the fact that of thirteen babies having a prolonged bleeding or coagulation time, three, or 23 per cent, had congenital syphilis. One other, seen before the infants were tested as a routine measure, showed hemorrhages from the mucous membranes, an increased coagulation time, and congenital syphilis, proved by a positive Wassermann reaction and characteristic autopsy findings. The coincidence of hemorrhagic disease and congenital syphilis has been previously pointed out; thus the author found that in an analysis of 200 autopsies performed upon new-born infants, in forty-one cases of hemorrhagic disease, seven, or 17 per cent, showed also evidence of congenital syphilis. Such findings suggest that a Wassermann reaction should be done upon every infant showing an increased bleeding or coagulation time. In this way some unsuspected cases of syphilis might be recognized and brought to early treatment. It has been noted during recent years that many infants born with syphilis do not present the classical signs of the disease at birth, so a more detailed study of the infants with hemorrhagic tendencies might serve not only to identify a number of syphilitics before the disease developed in later life, but also to throw more light upon the relationship existing between syphilis and hemorrhagic disease.

Another point of interest brought out by this study is the fact that hemorrhagic disease predominates in males. Of the thirteen cases showing prolonged bleeding or coagulation time, twelve were in males, the only female affected being Case 1451, the little twin who also had congenital syphilis. Kurtz¹⁵ also found that hemorrhagic disease affected males and females in a ratio of twelve to one. This at once suggests hemophilia which affects males and is transmitted through females, but, as Larrabee¹⁶ has pointed out, if these infants survive the first nine days of life, they show no further hemorrhagic tendencies.

Chart III represents the blood findings in Case 1348, showing the relationships between the bleeding time, the coagulation time, and the platelet

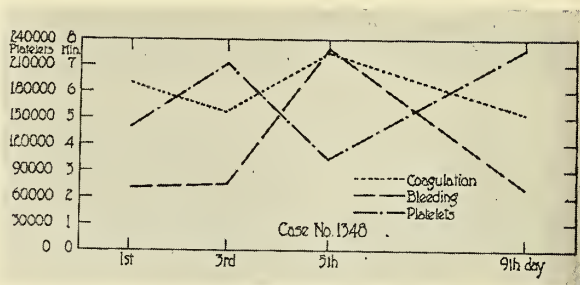


Chart III.

count, with the rise of the bleeding and coagulation times and the corresponding drop in the platelets on the fifth day, and the return to normal by the ninth day following the injection of blood.

Upon examination of the charts one is impressed by the fact that the majority of the cases show an increase in the bleeding time only, and that in only one case, No. 2108, besides the syphilitic that died on the first day, was there a prolongation of both the bleeding time and the coagulation time; even in this the coagulation time was only on the upper border of the normal. This at once suggests the possibility of the bleeding time only being of real diagnostic interest, but upon Chart I is seen one case, No. 2421, in which the coagulation time only is increased. This increase is a very marked one which came down slowly after several injections of blood. So, although the bleeding time may be the one most frequently affected, and therefore considered of most diagnostic value, yet the coagulation time may be affected alone, and, therefore, should always be determined.

Thus, in reviewing this series, one finds that in the 250 infants studied, thirteen, or 5.2 per cent, showed a prolongation of the bleeding time, the coagulation time, or both, and of these thirteen which were treated with subcutaneous blood as a result of the test, only two, or 15 per cent, developed symptoms and only one, or 7 per cent, died; in this one fatal case congenital syphilis was also present and probably played an important part. Including the one with normal blood, only three, or 1.2 per cent, of the entire series developed symptoms of hemorrhagic disease, and after the institution of these tests as a routine measure there was not a single death from hemorrhagic disease alone.

Surely results such as these more than justify making these tests a routine measure in a hospital. The saving of one life alone would more than

justify the labor of making the determinations for the entire series.

SUMMARY

1. Determination of the bleeding and coagulation times should be taken as a routine measure upon every new-born infant upon the third, fifth, and ninth days.

2. Before such a measure was instituted at the Miller Hospital, three of eighty-one infants, or 3.7 per cent, developed symptoms of hemorrhagic disease and two, or 2.4 per cent, died as a result of the disease.

3. After instituting the tests as a routine measure, of 250 infants, thirteen, or 5.2 per cent, showed a prolongation of the bleeding or coagulation time, or both. Of the 250, only two, or .8 per cent, developed symptoms, and one, or .4 per cent, died.

4. Of the thirteen showing a prolongation of the bleeding or coagulation time, in whom early treatment was instituted, two, or 15 per cent, developed symptoms and only one, or 7.7 per cent, died.

5. One case without any changes in the blood had hemorrhages from the bowel.

6. Of the thirteen showing increased bleeding or coagulation time, twelve were males and one female.

7. Of the thirteen, three, or 23 per cent, showed congenital syphilis.

8. The platelet count shows a curve corresponding to the curve of the bleeding or coagulation time, but is in itself of very little independent value as an aid in the making of the diagnosis of hemorrhagic disease.

9. There is an upward curve of both the bleeding and coagulation times on the third or fifth days and hemorrhagic disease is an exaggeration of this curve.

10. Prolongation of both bleeding and coagulation times usually occurs separately, rarely together. But, of the two, prolongation of the bleeding time is the more common.

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DISCUSSION

DR. F. C. RODDA, Minneapolis: I am very much interested in Dr. Warwick's paper. My interest was first aroused by Dr. Warwick's findings of so many hemorrhages in babies dying at the clinic of the University Hospital, during the new-born period. We attempted first to establish a normal coagulation and bleeding time with a new method. In the work which Dr. Warwick has done, I am pleased to see that her results are in unison with ours. We found that in most of the cases of hemorrhage, we had a prolongation of this normal bleeding and coagulation time. With the injection of blood underneath the skin, we were able to control hemorrhage and to reduce the times to a normal range.

If you ask the average medical man how frequently hemorrhagic disease occurs, he would probably state that it is a rarity. Such is not the case. In our study, we have shown the incidents of hemorrhagic disease to be about one per cent,—that is one in every one hundred new-borns. External hemorrhage, of course, is easily recognized; but the hemorrhage need not be external, for careful examination may show free blood about the brain, in the lungs, and in various other internal organs. In a careful check of 85 cases, we found five babies with prolonged bleeding and coagulation times; three of these had frank hemorrhages, one dying from a massive hemorrhage through the capsule of the liver. I am sure if the cases are carefully studied many more will be found. The injection of 30 to 40 c.c. of blood underneath the skin is curative in most cases. Sometimes, however, the injections have to be repeated three or four times at intervals of every six hours.

Our experience in regard to syphilis is about the same as

Dr. Warwick's. In mild cases, we found no disturbance of the coagulation time. However, if there were symptoms of a florid syphilis, we found prolonged coagulation and bleeding time, and further we found we could not reduce these times, and those babies died even when we gave transfusions of large amounts of blood into the superior longitudinal sinus. It seems as though the virus of syphilis destroys the desired coagulating properties of the blood injected, whereas in the usual hemorrhagic case we were apparently dealing with some deficiency which is supplied by the injected blood. The injection of blood is valuable only in the early stages. When the child has lost so much blood that it is nearly exsanguinated not much should be expected from the treatment.

Occasionally we have found hemorrhagic cases in which the repeated subcutaneous injections of blood gave no results until we changed donors. I have in mind a case where four injections of blood were given by the obstetrician, and we gave four more with no control of the symptoms. All of this blood was obtained from the father of the child. We then got blood from an uncle of the child and one injection sufficed to bring a cessation of the hemorrhage, and brought the blood back to normal. It would seem that in some instances where the injected blood is not giving the desired results, we should change donors.

THE COMMONER TYPES OF OCULAR TUBERCULOSIS*

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Some months ago my thought was to report at this meeting the ocular findings in a group of tuberculous children. Up to the present time I have examined about one-third of the children admitted and, aside from the usual refraction errors, very little of pathological or clinical interest was found. In view of the fact that tuberculosis of the eyeball is much more common in children than adults, and that it is practically always secondary to systemic tuberculosis, these findings are quite disappointing.

Ocular tuberculosis manifests itself in three distinct areas: (1) the palpebral and bulbar conjunctiva; (2) the anterior half of the eyeball, i. e., cornea, sclera and iris; (3) the choroid and retina. It has been, I believe, definitely proven that in the two latter areas, namely, that of the cornea, sclera and choroid, the infection is always secondary to tuberculosis in other parts of the body. In the case of the conjunctiva the infection may be either primary or secondary in origin. Primary conjunc-

tival tuberculosis is always unilateral, begins in the sulcus subtarsalis, where foreign bodies are more apt to lodge, and manifests itself as single or multiple ulcers surrounded by small gray nodules. Secondary conjunctival tuberculosis has the same clinical appearance and pathology, but upon general examination, dermal, pulmonary, nasal or lachrymal tuberculosis is found. The tuberculous conjunctival tissue when examined microscopically shows either typical giant cell systems or diffuse fibrosis and epithelioid cells with round-cell infiltration.

Phlyctenular or eczematous conjunctivitis is generally believed to be due to systemic tuberculosis, but conclusive proof is at present lacking. It is possible that the phlyctenules may be caused by the action of tubercle toxins. Verhoeff¹ believes that phlyctenular conjunctivitis and keratitis are dependent upon the phenomenon of anaphylaxis. The affected tissues, namely, the conjunctiva and cornea, become sensitized to tubercle toxin from a systemic infection in early life, and sometime later, during or following an acute infection which lowers the child's resistance, the old tuberculous focus again becomes active and a fresh infection follows.

Tuberculous infection of the eyeball proper is always secondary to systemic tuberculosis. The ocular infection occurs as a result of direct blood metastasis, and may be either acute or chronic. The acute type is characterized clinically by a rapid onset, quite a severe inflammatory reaction, a tendency to progress in spite of treatment, and results in destruction of the eye. Histologically it is characterized by solitary or conglomerate tubercles with extensive caseation. The structures usually affected are the iris, ciliary body and choroid. In the iris the infection usually assumes the form of a conglomerate tubercle with smaller tubercles in its immediate vicinity. These coalesce and spread to involve the entire iris, the angle of the anterior chamber and finally the cornea and corneo-scleral junction, at which point perforation of the globe usually occurs. In rare cases the infection in the iris may assume a diffuse character and tend to become chronic. Ultimately, however, necrosis occurs and destruction of the eyeball follows. The involvement of the ciliary body is chiefly in the subepithelial connective tissue, very rarely in the ciliary muscle. Here, too, the tubercle systems caseate early and rapid destruction ensues.

Metastatic acute choroidal tuberculosis is the most

*Presented before the meeting of the Lymanhurst Staff, June 27, 1922.

common of all forms of ocular tuberculosis. Miliary choroidal tubercles are present in from 75 to 85 per cent of all cases of general acute miliary tuberculosis sometime prior to death. The choroidal tubercles vary in number from three or four, to sixty or seventy. Both eyes are usually affected. In the less virulent types of systemic tuberculosis, the choroidal infection usually assumes the form of a single large tubercle resembling ophthalmoscopically a sarcoma, or a diffuse tuberculous choroiditis which spreads forward to involve the ciliary body and iris.

The chronic type of ocular tuberculosis is characterized clinically by a very slow course and a tendency to exacerbations and remissions. Histologically there is little or no caseation. This type responds readily to treatment, almost never leads to destruction of the eye, and never results fatally as does sometimes the acute type. The structures affected are the sclera and cornea and more rarely the iris and ciliary body. More commonly this chronic type of ocular tuberculosis has its origin in the anterior half of the sclera, from which it later spreads to involve the corneo-scleral junction and also the cornea, producing clinically a form of interstitial keratitis. This chronic form of scleritis and episcleritis is either nodular or diffuse in character, runs a protracted course, with remissions and exacerbations, and frequently involves both eyes before complete recovery occurs. Nodular scleritis has long been recognized and described as an inflammation dependent upon a rheumatic diathesis, or upon a disturbance of menstruation. It was not until 1907 that Verhoeff² proved by means of the tuberculin test and tuberculin therapy, that this type of scleritis was a tuberculous process. In his original communication he reported thirteen cases, all females ranging from eleven to forty-six years of age. While all showed involvement of only one eye, the other eye showed evidence of similar attacks in the past. In only three of the thirteen cases was it possible to demonstrate active tuberculosis clinically, but all responded to the subcutaneous tuberculin test. In eleven of the cases interstitial keratitis was present. Microscopically, the nodules consisted of focal proliferations of epithelioid cells, with a few giant cells surrounded by an infiltration of lymphocytes and plasma cells. The keratitis consisted of deep parenchymatous infiltration of the cornea extending from the sclera on the affected side, producing opacities of variable degree.

One of the most characteristic features of the chronic type of ocular tuberculosis is the apparently healthy condition of the patients. The temperature is usually normal, there are few or no constitutional symptoms, and the prognosis as regards life is excellent. How then do we account for these two distinct types of metastatic ocular tuberculosis—the acute or malignant type involving chiefly the iris and choroid, and leading to rapid perforation and destruction of the eyeball and frequently resulting fatally by general dissemination, and a chronic more or less benign type affecting chiefly the sclera and cornea, healing often spontaneously, but with frequent recurrences? The solution of the problem of these two distinct types is still unsolved. Undoubtedly it is a question of immunity, a tolerance of the host for the organism in one case and a lack of immunity in the other.

In the chronic type of ocular tuberculosis the bacilli gain entrance into the aqueous humor from the blood of the ciliary processes. From the aqueous, they are carried through the filtration angle into the canal of Schlemm and from there into the tissues drained by the anterior ciliary veins, namely, the sclera and cornea.

Since 1907 Verhoeff³ has reported the histological findings in two other cases of chronic ocular tuberculosis. In one case the eyeball was removed because of the onset of secondary glaucoma, and in the other case the patient died of tuberculous involvement of the hypophysis. These two cases showed, in addition to the usual tuberculous sclerokeratitis, superficial punctate tubercles on the ciliary processes, iris and posterior surfaces of the cornea. The pathology in these cases proves almost conclusively that the infection was spread by means of the infected aqueous humor. Tuberculous lesions identical with these found clinically have been produced experimentally by injections of bacilli into the anterior chamber of rabbits' eyes.⁴

Aside from these frank types of ocular tuberculosis there are other conditions which are due either directly or indirectly to systemic tuberculosis. In this group are included periphlebitis retinitis of adolescence, recurrent hemorrhages into the vitreous and retina, and certain forms of exudative retinitis formerly attributed to syphilis.

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THE DELAYED PEDICLE FLAP IN PLASTIC SURGERY OF THE FACE AND NECK*

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The loss of a small portion of the end of a transferred pedicle flap may transform a satisfac-



Fig. 1 (Case A371408). Scarring of neck, chin and ectropion of the lower lip, the result of a burn from a gasoline explosion one year before.

tory result to a poor cosmetic result. Davis has outlined many of the important points necessary in obtaining a good flap; first among these is the maintenance of the blood supply. While attention has been directed to the value of an artery in the pedicle of the flap, it is much more important that the venous return shall be unobstructed, since obstruction causes swelling of the flap and ultimate loss of a part of it (C. H. Mayo).

The most satisfactory method I have used to obtain a pedicled flap is the so-called delayed flap which I first saw used by Blair. According to

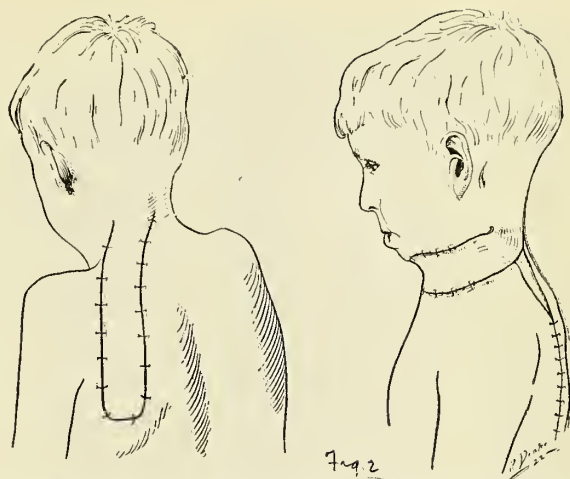


Fig. 2 (Case A371408). The flap elevated from the back, and sutured back in place. At the second stage, in ten days, the neck is freed, the scar tissue removed, and the flap brought in as a collar to elevate the chin. The lower part of the wound in the back is brought together.

tures should be separated sufficiently to allow oozing between them. Firm pressure is applied by means of gauze and adhesive plaster for at least a week to hold the flap in place and to prevent the collection of blood or serum under it. If the length of flap is to be employed. The flap is outlined and elevated from the surrounding tissue, as if it were to be transferred, but instead it is returned into the wound and re-sutured in its original bed. The sutures, however, Croft advocated the application of this flap, and it was also used by Tagliacozzi. The method is best applied when a long, narrow pedicle



Fig. 3 (Case A371408). The pedicle replaced after being cut off in stages. Note the elevation of the chin.

*Read before the Northern Minnesota Medical Society, June, 1922, Detroit, Minnesota.



Fig. 4 (Case A360644). Scarring of the right chin and neck from a burn.



Fig. 5 (Case A360644). The flap from the right side of the neck elevated and sutured back in place. In ten days it is again elevated and after the removal of the scar in the neck it is sutured in place.

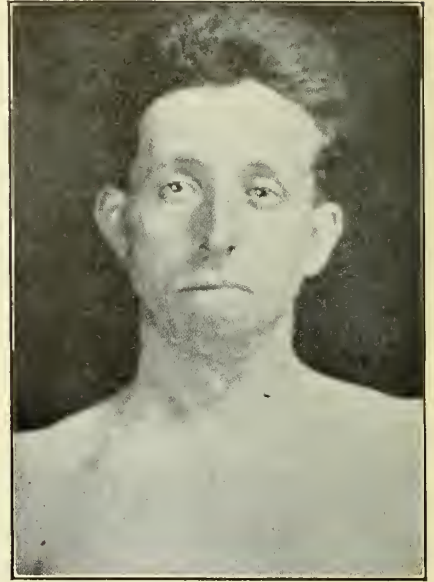


Fig. 6 (Case A360644). After operation.



Fig. 7 (Case A328224). Showing the perforation into the nose, one year after the removal of an epithelioma with cautery and radium. Scar tissue alone remained over the entire nose so that it was necessary to replace this with skin.

Thiersch graft on under side of flap



Fig. 8 (Case A328224). The flap elevated from the forehead and a Thiersch graft placed under the distal end, the flap is then sutured back in place. After ten days it is elevated and brought down to the nose. The graft that was not necessary to cover the perforation is removed. In two weeks the pedicle is cut across in stages and the flap returned to the forehead. Because of the lack of subcutaneous tissue in this case the procedure would have been impossible without the delayed flap.



Fig. 9 (Case A328224). After operation.



Fig. 10 (Case A336942). Traumatic loss of the tip of the nose.



Fig. 12 (Case A336942). After operation.

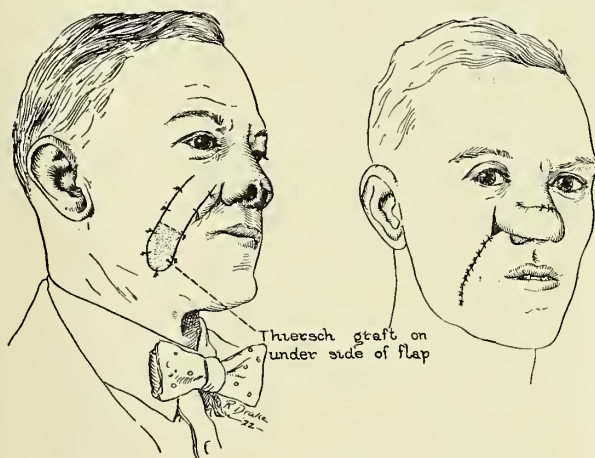


Fig. 11 (Case A336942). The flap elevated from the cheek and a Thiersch graft placed under its distal end before suturing it back in place. At the second stage the flap is elevated and sutured over the tip of the nose. In ten days the pedicle is cut and replaced on the cheek and the suturing of the new tissue to the nose completed.

the flap makes the blood supply to the distal end questionable, the flap may be left attached at both ends and the distal pedicle cut off in a week or ten days. The cutting of the pedicle should be done a little at a time, rather than all at once. In this way the blood supply and venous return pass through one pedicle. In ten days or two weeks from the time the flap is first elevated, it may be elevated again and transferred to the defect. This is readily accomplished without anesthesia, the area around the defect alone requiring cocainization. Although the method necessitates an additional step in the operation, it insures the blood supply and any part of the distal end of the flap is rarely lost; so far I have not had such loss in my work.

The same method of elevating the Lane flap and suturing it back in place may be used in secondary operations in cases of cleft palate. The flap is elevated on one side with the pedicle along the mesial margin of the palate and then sutured back in place. In a week, if the color of the flap is good, it may be turned over and operation completed in the usual manner. If there has been any sloughing of the flap there is no real loss and the same procedure may be employed on the opposite side of the palate to determine if a flap may be obtained there.

Another advantage of the delayed flap is that when the transfer of the flap is made, the skin is thin and flattened like normal skin and not thickened so that dissection of a core of the tissue is required, as is necessary in the tubed flap of Gillies. If a double epithelized flap is necessary for the purpose of filling a defect of the nose or cheek, a Thiersch graft may be placed in the wound (raw surface up) where the flap has been elevated. In suturing the flap the needle carrying the suture is passed first through the flap, the Thiersch graft, and then the margin of the skin, in order to suture and hold the graft in its correct position.

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A CASE REPORT OF DISSECTING ANEURYSM OF THE AORTA, WITH DISTINCTIVE X-RAY FINDINGS

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Crowell's recent article in the American Medical Association Journal of December 31, 1921, on "Dissecting Aneurysms of the Aorta," has prompted us to report this case, partly on account of its rarity, and partly because we think the x-ray findings are distinctive and characteristic of this condition in a certain group of cases.

HISTORY

Mr. A. G. White. A mechanical engineer. Age 63 years.
Family History: Negative.

Past History: Always well but for a third degree burn from hot copper in 1898. Denied venereal disease, but had a prostatitis in 1917.

Complaint: Was first seen by Dr. T. L. Chapman on Nov. 20, 1921, on account of a severe pain in the upper abdomen four or five hours after an ordinary supper. This was accompanied by vomiting, profuse perspiration, apparent shock, and a temperature of 101° F. An hour later the pain was distributed generally over the abdomen. A white blood count of 14,000 was found, and fearing an acute abdominal condition the patient was immediately transferred to St. Mary's Hospital.

PHYSICAL EXAMINATION AND CLINICAL COURSE

Physical examination at that time revealed, in addition to the elevation in his temperature, a pulse rate of 110, normal in rhythm. The blood pressure was 212 systolic and 118 diastolic. The apex beat was displaced outward in the sixth interspace, 2 cm. beyond the nipple line. The second heart tone in the aortic area was short and accentuated. Examination of the lungs revealed râles posteriorly in both bases. The abdomen was extremely boardlike everywhere, particularly on the right half of the body. Urinary examination disclosed albumin in moderate amounts, hyaline casts, and a few pus cells.

The patient continued to vomit, and it was assumed that an operation would have to be done the following morning. However, the next day his leukocyte count was 7,000, his temperature was normal, he had ceased vomiting, and the abdomen was considerably softer, except close up under the ribs on the right side.

The patient was seen in consultation with Dr. E. L. Tuohy at this time, and it was decided not to operate.

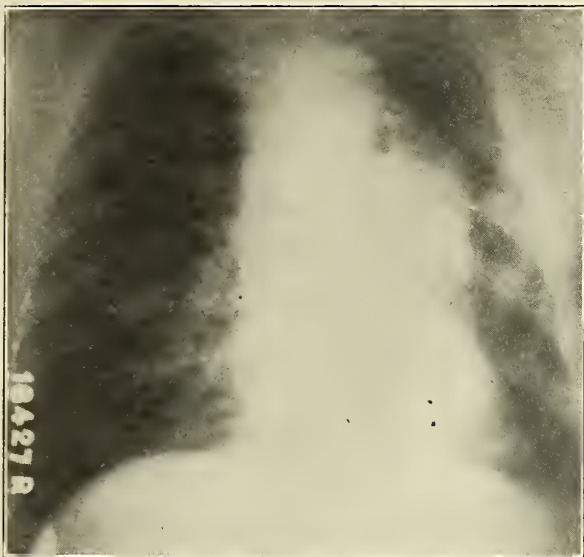


Fig 1. Roentgenogram showing shadow of aneurysm in left side of chest.

Consideration was given to the possibility of an abdominal angina.

On November 26th, after three or four days of a gradual convalescence, the patient was permitted to go home, where one of us first saw him on Dec. 9, 1921. His heart action at that time was excellent as far as the rhythm was concerned, but the pain in the upper abdomen was still present from time to time, apparently of the anginal type. His blood pressure at this time was 200 systolic and 120 diastolic. The Wassermann test was negative.

On the 24th of December, 1921, the patient was able to be up and about, so that he came to the office for further examination. At this time the patient was complaining of little pain, but had a good deal of respiratory distress and shortness of breath. Examination of the lungs revealed dullness at the left base, with a few râles. The right side was free of râles. A fluoroscopic examination was made, and rather astonishingly we found an extremely large shadow to the left of the heart, the nature of which can be best understood by consulting Figure 1. Stereoscopic roentgenograms were made, and it was seen that the shadow was radiolucent and not of a uniform density, extending from a point corresponding to the top of the arch of the aorta to the left, outward and downward, nearly to the periphery, forming an obtuse angle, and then turning directly downward toward the diaphragm, where its further course could not be traced on account of its fusion with the denser subdiaphragmatic structures. The unusual radiolucence, with the aortic shadow obviously extending down along the inner portion of this shadow, and the visualization of the hilus markings through it, were considered unusual, and various diagnoses were considered. We could conceive of no shadow which could be correlated with the radiologic findings, unless we considered the possibility of a dissecting aneurysm. This was based on the fact that the shadow apparently was continuous at its origin with the aortic surface, because the shadow apparently extended down into the abdomen, and because we could

think of no other condition except a dissecting aneurysm which had undergone recanalization, at times free of blood, which would permit of this curious radiolucent appearance.

On Feb. 1, 1922, it was noted that the patient had flatness in the left chest, extending over two-thirds of its area posteriorly, evidently an accumulation of fluid. On aspiration Dr. Chapman withdrew 1,000 c.c. of clear, straw colored fluid. At this time the patient was comfortable, with the exception of nocturnal respiratory distress and a slight cough. By taking his blood pressure it was recognized that he had an alternating pulse and that the highest systolic reading was 185, and the diastolic 120. The patient was difficult to control, and his mind at times seemed to be temporarily unbalanced. A Wassermann test was again negative.

The patient was reaspirated on the 13th of February, and again on the 22nd of February, each time with the evacuation of 500 c.c. of a clear, yellow fluid.

The patient gradually weakened, and it was necessary for him to sit up almost constantly, leaning forward, in order to give him any degree of comfort. Morphine was administered hypodermically, according to the need.

On the 19th of March, 1922, the patient had retired, apparently comfortable following his hypodermic of morphine. Rather suddenly he called to the nurse, but before she reached his bedside he had passed away.

CLINICAL DIAGNOSIS

Chronic interstitial nephritis, generalized arteriosclerosis, angina abdominalis, and dissecting aneurysm of the aorta (?).

NECROPSY

Performed by one of us (Boman) March 20, 1921:

A necropsy was performed in this case, with special interest centering on the findings in the mediastinum.

The thorax and abdomen were opened in the usual manner. The findings in the abdomen, briefly, were as follows:

The peritoneal surface was found to be uniformly smooth, moist, of normal color, and without any evidence of adhesions. The stomach and intestines were removed and found to be normal throughout. The liver was slightly enlarged, and was somewhat yellowish in color, suggesting a fatty degeneration. The spleen was slightly larger than normal, soft and pulpy. The kidneys were removed, and the capsules proved to be very adherent on stripping, tearing away part of the kidney substance. The stripped surfaces of the kidneys were of a mottled, grayish color, and granular. On section, the cortex was narrowed, having a proportion of about one to four, or one to five, in relation to the medulla. The pelves and the calices in both kidneys were small. The remaining organs in the abdominal cavity were normal.

The chest plate was removed. The left pleural cavity was filled with free clotted blood, suggesting at once a ruptured aneurysm. The thoracic viscera were removed in toto, and later dissected. The lungs were normal, except for a few calcified nodules in the hilus of each lung, and a marked pneumoconiosis. The pericardial cavity contained but a few c.c. of a pure yellow fluid. The heart itself was moderately enlarged, and showed hypertrophy of the left ven-



Fig. 2. Gross specimen of heart and aorta showing course of dissection.

tricle. The myocardium was soft; the valves normal. The aorta was carefully examined, but in removing the thoracic structure from the body it was severed at the diaphragmatic opening, which made it impossible to remove the affected area in one piece. In the photograph, however, these two pieces were sewed together, so as to again show the normal relationship.

It was seen that the patient had a dissecting aneurysm, beginning in the arch of the aorta, and extending down the descending aorta and both iliac arteries, to the femorals on each side. The aorta was opened from above downward, and in its upper area there were yellow raised patches throughout, with some depressed areas, of the typical hill and dale variety, common to luetic aortitis, with some atheroma. About three inches from the arch, in the descending aorta, and on its outer aspect, there was a rupture about one-half cm. in length, in a portion of the aneurysm which had formed a sac. The dissecting portion of the aneurysm almost completely enveloped the aorta for about three-fourths of its circumference, in the various parts, and began above on the lesser curvature of the aortic arch at its more distal portion. Immediately opposite the sacculation there was a second opening from the main aortic channel into the aneurysmal portion. Farther down there were five or six smaller openings, which are not shown on the photograph. Below, where the aorta divides into the iliac arteries, the dissection formed an "S" shaped loop,

which is marked off on the photograph with small rubber tubing, showing its course very plainly. The dissection continued on down through to the beginning of the femoral arteries on each side, where it was noted that another perforation existed from the aneurysmal portion into the main channel of the femorals, where the dissection of the coats of the vessels terminated and recanalization was completed. These two perforations are marked with rubber tubing also. The dissection had apparently forced its way between the structures of the media, as the aortic wall showed the intimal and part of the medial structures and the outer aneurysmal wall, the adventitia, and some of the medial layers. The inner lining, however, of the aneurysm, and the outer wall of the aorta, were smooth and shiny.

COMMENT

Kelynack, quoting Crowell, divides dissecting aneurysm into three classes:

1. Those in which the blood remains in the dissected aortic wall.
2. Those in which the blood is forced into the surrounding tissues or cavities.
3. Those in which the blood re-enters the aorta or one of its branches after completing canalization.

Peabody divides the pathologic progress of the condition into three stages:

1. Rupture of the internal coats of the aorta.
2. Dissection and possible rupture externally.
3. Recanalization. Fourteen per cent only live sufficiently long for recanalization to be completed.

The interesting and distinctive features of this case center chiefly on the rather remarkable roentgenographic findings:

The radiolucence of the shadow, with the visible hilus glands seen in front of it, and the apparent aortic shadow on its inner side, would, with similar roentgenographic findings, I believe, establish definitely the diagnosis of a dissecting aneurysm with recanalization ("third stage" of Peabody). I can conceive of no other condition that would give us an analogous finding.

The patient's acute attack was undoubtedly associated with the dissection of the coats of the abdominal aorta, as the only other plausible cause would be temporary occlusion of the aortic branches in the abdomen. The necropsy findings show no area in which an occlusion of this kind had occurred.

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EDITORIAL

The Proposed Minnesota Psychopathic Hospital

Dr. Hamilton's able presentation of the need of a psychopathic hospital in connection with the University appears in this number of MINNESOTA MEDICINE. A copy of this address is to be mailed to each state legislator as authorized by the House of Delegates of the Minnesota State Medical Association at their meeting in Minneapolis in October. Each Association member should familiarize himself with the subject at least to the extent of reading this short article so as to be able to lend his influence in his particular district to this most important matter.

If there is one special sphere in which the average doctor is woefully weak it is in a proper understanding of nervous and mental diseases—their diagnosis, treatment and prognosis. This applies not only to the Minnesota Medical School graduates but to graduates of most other schools. These diseases cannot be learned from books alone but require the opportunity to study patients so afflicted.

Reliable figures show that there are in our country over a million individuals distinctly feeble-minded, epileptic, or insane. Some 250,000 are

cared for by the institutions of this country. This number does not, of course, include an additional vast number of the so-called morons who make up such a large percentage of the criminal classes. The cost to the state in the care and control of these elements of society is already immense and becoming more and more of a load. Measures for the prompt remedy of the situation either by institutionalizing and thus, temporarily at least, preventing propagation, or more drastic measures, will have to be adopted eventually.

Stoddard* has recently shown that the civilization in our own country is being dangerously threatened by the unrestricted propagation of the less intelligent elements in the population. The Binet intelligence tests have shown that over half of the population must be classed below thirteen years of mental age. The more complicated life becomes, the less able are those poorly endowed to cope with the complexities of life and the resultant unrest may finally result in a chaos such as exists today in Russia.

The protection of organized society thus demands that more attention be paid to the study of the care of these nervous and mental cases, and how appropriate that the State University should take a part in this work.

The Veterans' Bureau has just determined to institute a post-graduate course in Washington for the purpose of training physicians in this nervous and mental specialty to care for the veterans in institutions being opened by the Bureau. There is such a scarcity of specialists to care for this work that this step has been made necessary.

Our state legislature will have a marked change in personnel this year and all eyes will be directed to see how such a proposed extension of the sphere of medical training will be met. There may be some room for a difference of opinion as to the exact location of a psychopathic hospital. Personally, we do not believe the campus to be the most desirable location, but a spot within easy access to the students and the friends and relatives in the Twin Cities of patients under treatment should be the consideration. It is an obvious injustice to require friends and relatives to make the long trip to Rochester and St. Peter in order to visit a committed individual.

*Stoddard, Lothrop, A.M., Ph.D.: The Revolt Against Civilization. Chas. Scribner & Son, New York, 1922.

Unnecessary Noise in Hospitals*

A tale is told of an irritable man who lived in a large hotel. With full appreciation of his fear of noise, he occupied an end room, but also paid for the one next adjacent. The usual convention flood induced the overwrought clerk in the office to give this room to a very tired customer, with the extreme abjuration that, "he was not to make a particle of noise." The inevitable happened: while striving to remove his shoe with extreme care he dropped it with an unquestioned thud. Then he slept joyously for many hours, to be finally awakened by an outraged pounding on the door, with the stentorian demand on the part of the Irritable One, "Why in thunder don't you drop the other shoe?"

One looks for noise in a boiler shop, and a football game is a failure without it, but a noisy hospital has its best opportunity with comatose patients. There is no place in the hospital where noise is any advantage; there are several where it is of extreme annoyance, and even may become a hazard to life:

1. In and about the operating rooms, where patients are entering upon and coming out of general or gas anesthesia. Absolute quiet is a great boon to the patient.

2. To an even greater degree is this necessary where local or regional anesthesia is being administered.

3. In the halls, where in the early morning, by the moving of laundry and supply carts, the hours of the patients' rest is much broken. This noisy period is only a little better than a noisy interval in the evening when they should be going to sleep.

4. It is most difficult to obviate the inevitable noise incident to dishes and the moving of culinary devices—fortunately kitchens and elevators have been much improved.

5. Then, lest we shift all the burden to others, please note the number of physicians and surgeons there are, with deep, resounding voices. One would never recognize the feeble gasp as heard in our medical conventions, when contrasted with the same voice raised in sarcastic suggestions relative to the oversights of the hall nurse.

6. Of course we must not forget the natural and human tendency of youth to indulge in con-

versation and laughter. Fortunately, most nurses in training are young; despite their number, the nurses are undoubtedly not the greatest noise makers. They are under direction and control; the staff, visitors, orderlies and general helpers, frequently are not.

7. Noisy elevators, flapping doors and windows, resounding corridors and floors, squeaking and snapping radiators—many of these are obviated naturally in recent and modern construction, but remember that old hospital space cannot be junked at once. The use of such buildings calls for unusual thoughtfulness and patience.

8. Finally, of course, the noisy patient. It has been wisely said, "What a lovely and decorous place the hospital could be if it didn't have any patients." It is not that the hospital should be utterly void of animation or life; on the contrary, there is a natural noise that is the product of all life. Special observers tell us that even the staid rocks when studied with suitable microphones produce a characteristic murmur. Let us have, therefore, the normal hospital murmur, but no more.

—E. L. T.

Woman's Auxiliary of the M. S. M. A.

At the time of the last meeting of the Minnesota State Medical Association the formation of a Woman's Auxiliary was approved by the House of Delegates and a meeting was called of the wives of members which, in brief, resulted in the election of officers and the appointment of a committee to draw up a constitution.

Texas for some time has had such a woman's organization and at the American Medical Association meeting in St. Louis was largely responsible for the authorization and formation of a Woman's Auxiliary of the American Medical Association. Texas women appear prominently in the list of officers elected at St. Louis and have been the moving spirits that have been spurring their sisters on to form State Auxiliaries which are to be component members of the National Auxiliary.

The Minnesota women have not been backward in assuming the responsibilities of an organization whose future activities will fully justify its existence. The auxiliary idea is not a new one in Minnesota as the Hennepin County Society was one of the very first, we are told, to form an auxiliary and Ramsey and St. Louis counties have also had more or less active organizations for some time.

*To appear as editorial in Hospital Progress, December, 1922.

It would seem that the main activities of this newly formed State Auxiliary will consist in exerting its influence among the various women's organizations. At no time has there been a greater need for the dissemination of the truth regarding medical matters by individuals correctly informed regarding such subjects. The doctor's wife as a rule has absorbed a surprisingly rich fund of medical knowledge and should be a first-rate publicity agent. The recent public lectures held in Minnesota in the interests of anti-vivisection and the anti-vivisection measures recently presented to the voters of Colorado and California are good examples of the need for wide dissemination of medical truths. How a woman can publicly take the platform and plead for legislation which will make medical treatment of such diseases as diphtheria, lockjaw and meningitis powerless and inconsistently refuse to deny herself furs, aigrettes and meat, passes understanding.

But this is not a plea for vivisection but rather an expression of our best wishes for the success of this new organization, instigated and managed entirely by—our wives.

OBITUARY

DR. N. L. LINNEMAN*

Dr. N. L. Linneman's untimely death is the first to occur within the ranks of our present regular staff. The late Dr. C. D. Conkey had left Duluth some months previous to his demise. Dr. Linneman had remained an active member up to the very time that his final illness incapacitated him. In addition he was one of the earliest internes of this hospital, coming here directly from the University of Minnesota in July, 1902. Concerning some of the earlier internes, notably Dr. Abbott, nothing particular is known at the present time; but the only other known death among the previous internes at St. Mary's Hospital is that of the late Dr. Donovan, who died of angina pectoris in Litchfield about two years ago.

It is therefore particularly fitting that this staff and hospital give especial attention to the unfortunate and extremely early passing of Dr. Nicholas L. Linneman. This brief reference to his life and medical endeavor should be filed with the regular staff proceedings, because biographies of medical men soon become most interesting and useful—stimulating and helpful to those who come on to succeed in our profession. Often, unless these reminders are penned currently, memory is fleeting, and soon the occasion as well as the material is all lost. Further, in reading medical biography it is clear that it is not so much a recital of the

points of conformity of the individual to the usual standard that challenges the interest and fascinates the historian, but rather the definite points of difference—the shades of individuality, or even of eccentricity.

The doctor was born in St. Joseph, Minnesota, a small town really in the environs of St. Cloud. For years his father and mother had been pioneers in a region then plentifully inhabited by Indians. They handled a very large general store and sold everything from farm machinery and groceries to fine laces, to a people also hardy pioneers residing within a radius of 50 to 100 miles.

There were in the family four brothers and four sisters; Nicholas with the others early entered into the routine work of his father's store, and later continued with one of his brothers in the work of a store in Brainerd.

It was, however, his elemental dislike for merchandising that led him to make far more than the ordinary effort to get a professional education and caused him to spare no sacrifice to secure a medical degree. He had an early admiration for the medical profession; a sincere desire to become a doctor; having accomplished this goal he asserted it as his purpose to do nothing that would detract from the glory of his adopted profession.

His early training, corresponding to the high school, was often interrupted by the need of going to work, and the financial reverses met by his father, incident to a very free tendency to extend credit to his customers, and a changing spirit among the people as that great western prairie in Minnesota settled up. As he often himself stated, he entered the University with the equivalent of the pre-medical preparation then demanded, except that he had a few conditions that he had to work off. These annoyed him very greatly, but more than this, he had not had the technical training in the well developed laboratories such as was then common in the best high schools in the large cities. With a natural tendency to worry over his work, he took upon himself the study of medicine extremely seriously.

Career at the University of Minnesota

The writer met Dr. Linneman at 1308 7th St. S. E., Minneapolis, when we entered the University simultaneously in the fall of 1898; the writer to enter the academic department, Dr. Linneman to enter the medical school. The first contact came through listening to his small feet pattering down the hall, in a quick impulsive step that no one else could ever copy. Then as he spoke to his friend and later colleague, Fay Brigham, it left the hearer with the impression that his voice was disturbed by a bad cold. These personal matters are mentioned because his physical stature, appearance and make-up had much to do with his life, his outlook, and his disposition. It seemed clear that he really expected people, on first meeting him, to note the unusual in his appearance. In a measure this made him somewhat shy. Once having met him, however, and recognized his extreme warm heartedness and absolutely wholesome manner, he fastened his friends to him in a degree often denied those of outward commanding physique or unusual presence. Sometimes, in fact, the latter type of individual repels; seemingly offering so much, he gives so little.

Everyone in and about the medical department knew "Linneman." The late greatly admired and stimulating teacher of pathology, Dr. F. F. Wesbrook, was unusually fond of him, although he recognized that his work was

*Read before the Regular Staff Meeting of St. Mary's Hospital, Duluth, Minn., the evening of Nov. 2, 1922.

coming rather hard for him. He graduated from the University of Minnesota in the class of 1902, with a group of noteworthy men. Their most distinguished member has been Dr. E. S. Judd of Rochester. At that time the Minnesota classes were relatively very large, because later increases in entrance requirements brought the number down considerably. It was the day also of much didactic teaching and large lecture rooms. Most of the clinical material seen at close range was then available at the old dispensary across the river on Washington Avenue. Dr. Linneman was one of the first to actually live at the dispensary for short intervals in order to be available for emergencies and many later men followed this example, going out and making calls in the poorer section of Minneapolis. The late Max Vanderhorek gave very vivid clinics at that time in this free dispensary and no doubt did much to direct the young physician into his specialty.

His coming to Duluth was not entirely an accident. Remember his early home was near St. Cloud. Also that the late Venerable Mother Scholastica and her own Sister and Successor Mother Alexia brought the branch and seed of the Benedictine order from St. Joseph to Duluth, where it has thrived so wonderfully and produced so abundantly. It was therefore into an environment that was most favorable toward him and to an order that knew well his sturdy Dutch and German ancestry; all the good Sisters welcomed him and gave him the opportunity he made good use of. Some of the older Sisters relate that he remarked on coming here that he had "just \$3.50 left." He came with his classmate, roommate and bosom friend from St. Cloud, Fay Brigham.

In these periods "Nick's" legs moved even faster than ever and he feelingly referred to himself as the proverbial "Cranberry Merchant." Certainly his application won for him the statement, often repeated and heard now at the time of his death, from the Sisters: "Our most faithful interne." Also it is certain that it won for him the notice of Dr. S. H. Boyer, who offered him a place with him in his office. The latter was then coroner and Dr. Linneman frequently mentioned the great opportunity the post-mortem material gave him, and the unusual acquaintance and professional guidance and friendship this fortunate association gave him.

From 1903 to 1910 he energetically practiced in Duluth. Few men will ever in the day stand at "Medical Attention" as assiduously as he did: living in his office in the Lyceum Building, he left it only to dash out for food or to traverse Duluth in any section on "calls." Barely do we now realize how much better the public is educated than fifteen to twenty years ago. Night calls were legion and hospital practice was practically reserved for the very ill or homeless.

On one occasion he remarked that he had had over 300 confinement cases (this in 1906) with no mortality. This represented a very large amount of toil and much of it among those who were never too affluent. Older nurses frequently spoke of his great popularity in the accouchement chamber—a delicacy and courtesy of manner and lack of boorishness—always a great asset to the physician.

In fact he had a sensitiveness to pain himself that was extreme, and did not wish to visit it on others. Despite his great skill, later developed, in cystoscopy he shrank from

doing even a meatotomy. He had, as it were, a natural shrinking away from any of the surgical leads even of his own specialty.

He spent much of 1910 and up to March, 1911, in European study. He was one of a large number of Americans that were much influenced and trained by the Vienna school. During the late war he returned some of their goodness by very magnificent donations of gifts and money to those stricken teachers and people. To Kren especially did he owe and return love and gratitude; they often corresponded. The remaining members of the "Pension Welzer" had much reason to bless him, as the writer did well personally know.

Returning to Duluth he soon thereafter joined the writer and some others in an office affiliation that later grew into the Duluth Clinic. He instituted a most conscientious Wassermann, and gave most freely of his time and talents with this and any other of his special attainments to any patient or doctor who sought his aid. His early accuracy in this field of serology did much to teach us all, and to institute a better line of treatment in a much neglected field: chronic syphilis.

His knowledge of skin was excellent and he had the confidence of Harris, Pucey, Ormsby and others whom he frequently visited. He suffered because he was a poor history taker and a poorer recorder of what he did and saw. Some of his early practice led to this in part. So strong an influence did he have over his patients and so well did he remember their personal angles and differences that he never developed a statistical sense and it robbed him of much of the advantage accruing to modern specialism. However, this arose from his inherent distaste for subordinating personal contact to anything else.

Like many of German descent the war bore heavily upon him. He entered the service, because he loved his country passionately. Like most of us he was no militarist and the whole army idea was repellant to him. He never should have been rushed through the army medical training camp; his was no kind of physique to be submitted to that standardized motley of clerical instruction and physical exposure and overactivity.

Nevertheless he served the army and his country well. Col. Frick, Capt. Swift, and Lieut. Posey (all meeting him at the Base Hospital at Riley), have borne witness to this. He worked hard and in addition to the awful strain of the influenza epidemic, fell a victim to the disease himself and nearly died. Indeed it is likely this severe toxemia left its imprint, because he was never the same after his return from the army. Once in 1906 he had a severe fibrinous bronchitis. Disease always depressed him and he usually feared a bad outcome; a tendency to bronchitis and a recurrence always haunted him thereafter. Frequent sinus infections and much tooth and gum pathology left the easy nidus for the diffuse glomerular nephritis that led to his lingering death in this hospital on October 30, 1922.

He was much beloved by all who knew him. He had few interests outside of his profession, but dearly loved music and played the piano some himself. A sister is a skilled organist and director; another is an artist of recognized ability.

Few who ever knew him well or met with him in medical gatherings will ever forget certain things: his nervous removal of his ring during his work; his high pitched staccato

cato laughter; his smoking with short, snappy puffs and the apparent sniffing of the burning tip of the cigar after each puff. Of children he was extremely fond, as his many doctor friends knew. His Christmas season was a pathetic bustle to enable him to forget no one. He much enjoyed motoring, but his own ventures were marked by a series of near accidents in driving, that reminded one of his skill in major surgery. Withal, he was one of the best traveling companions the writer has ever enjoyed. Always he wanted to see the good things and patronize the good restaurants. He loved good food and particularly rich meat. Hence the irony of fate that he should develop a disease that visited on him the detested and tasteless pabulum of the toothless!

One pleasant memory he brought back from the army: a large buxom negress who cooked for the Officer's Mess at Riley. Her counterpart he installed in a cottage on Park Point and at last for many months had respite from the awful grind he pursued for years—the visit of Superior Street restaurants.

And so in the gathering fog of Tuesday evening, October 31, the St. Louis County Medical Society joined in the procession that took him down Superior Street for the last time. The thought comes how few there were who even knew who was passing. Few people in the past twenty years covered more consistently that busy space between Lake Avenue and Fifth Avenue West, always with a cordial greeting to many he met and the use of the surname.

Today he has been buried with his parents. He has returned and joined them; he did them no discredit. He was true to his profession; all of us wished to be at his grave today. He was true to his country—a firing squad of the American Legion has been there to bear testimony to his service. He has passed—let us revere his memory.

E. L. TUOHY.

DR. E. L. MAURER

News of the death of Dr. E. L. Maurer of Brownton, which occurred at Eitel hospital, Minneapolis, October 22, 1922, came as a shock to everyone who knew him. Although he had entered the hospital for treatment two weeks previous to his death the prospects for his recovery were good.

Edmund L. Maurer was born October 10, 1878, and spent his boyhood in Brownton, attending the public schools there. He later attended the University of Minnesota, from which institution he received his diploma in 1904. After serving as interne in the city hospital, he practiced for a time at Blackduck and Clara City, moving to Brownton in 1905, when he took over the practice of Dr. D. W. Bolles.

Dr. Maurer was a recognized physician in his vicinity and was regarded in high esteem among his fellow townsmen. He was active in community affairs, serving as an officer of the Commercial Club of Brownton at one time.

Dr. Maurer was a member of Phi Beta Pi fraternity, Guardian Lodge, the Modern Woodmen of America, and was an active member of the McLeod County Medical Society, of which he was secretary up to the time of his death.

Dr. Maurer is survived by his widow, his mother, two brothers, Claude Maurer of Spooner, Wisconsin, and Paul

Maurer of St. Paul, and three sisters, Mrs. J. Funk of Cedar Rapids, Iowa, Mrs. O. W. Turner of Atchison, Kansas, and Miss Helen Maurer, Denver, Colorado.

HERMAN EMIL MOLZAHN

Herman Emil Molzahn was born near Berlin, Germany, March 23, 1879, migrated to this country with his parents when three years old. He was raised on a farm in western Nebraska and received his early education in a little log school house. Later he moved to Minnesota, where he completed a business course and also the necessary requirements to enter the University. In 1904 he entered the Medical Department of George Washington University, Washington, D. C., and graduated in 1908. After completing one year as interne in the City Hospital, St. Paul, he entered private practice at Belle Plaine, Minnesota, where he remained until 1913, when he went to Vienna and received one year in postgraduate instruction in diseases of the eye, ear, nose and throat, returning to St. Paul in 1914, where he practiced his chosen specialty until his death, October 25, 1922.

Dr. Molzahn was as nearly a self-made man as it is possible for anyone to be. Starting as he did from the very bottom when he left the farm, he worked his way through school and then through college; he mastered a great many obstacles and succeeded. He early realized that the field of medicine was too large for anyone to master perfectly, so he chose a specialty and his work certainly was ample proof of his high attainments. No one could know Dr. Molzahn without being impressed and inspired by his untiring devotion to his work, his patients and his loved ones. It seemed that his efforts to gain greater proficiency in his work were practically relentless. All through his life he had been absolutely honest with all his fellowmen; his life was clean, useful and inspiring. His death was so untimely, but his memory will not only long be cherished by all who knew him, but he is a distinct loss to the medical profession and his community.

A. J. MOLZAHN.

Dr. James W. George of Minneapolis was born on June 29, 1869. He died Oct. 16, 1922. He was a member of the staff of Abbott Hospital, Hennepin County Medical Society, Minnesota State Medical Association, and the American Medical Association. He was formerly instructor in anesthetics at the University of Minnesota.

Modestly, calmly but steadfastly, Dr. Jas. W. George lived and thereby set an example which it would be well for us to follow. A kind doctor among the sick, an honest student, a Christian gentleman. What more need be said?

Humor without a sting, honesty always, never malice, respected for his skill and loved for his gentle heart, his associates were the better for his influence.

Praise, even well earned, was an embarrassment, while a good word for his fellows was a joy.

A life of goodness was the ample insurance he carried for the world beyond toward which he always looked with faith and content.

A. W. ABBOTT.

NEWS OF THE HOSPITALS

The Lake City hospital was reopened Monday, November 6, with a full staff of registered nurses after being closed for a period of several months. Miss Florence Phillips of Lake City will be in charge of the hospital. Miss Mabel Brask of Minneapolis will be the surgical nurse, with Miss Annie Anderson of Wisconsin as night superintendent. The hospital board has announced that more nurses will be added to the staff as the hospital work increases. The nurses' training school will not be conducted for a time.

The site for the addition to St. Luke's Hospital at Duluth is being cleared. Three houses which formerly served as nurses' homes have been moved and one is to be razed. Actual construction will begin as soon as the ground is cleared.

The quarterly change of services for the internes at St. Mary's Hospital, Duluth, took place October 15, 1922. During the year a 78-bed addition has been added to the hospital. The library of the St. Louis County Medical Society is housed at the hospital, affording excellent opportunities to internes for study and reference.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

SOUTHERN MINNESOTA MEDICAL ASSOCIATION

The next meeting of the Southern Minnesota Medical Association will be held in Mankato on December 4 and 5. The meeting will commence promptly at 1:30 p. m. on Monday, December 4. The banquet will be given at 6:30 p. m. The following guests will address the members: Dr. Clifford G. Grulee of Chicago, Drs. Arthur Steindler and Howard L. Beye of Iowa City, and Dr. V. J. LaRose of Bismarck, North Dakota. The program will be resumed on the following morning at 8:30 and will close at noon with a luncheon given by the physicians of Mankato.

An effort has been made to make this program of as much interest to the general practitioner as possible and the material has been so concentrated that the entire program can be attended within twenty-four hours.

Dr. C. C. Pratt of Mankato is chairman of the Entertainment Committee and Dr. A. F. Kemp, also of Mankato, is chairman of the Committee on Arrangements. Applications for hotel reservations should be made at once through Dr. Kemp. Headquarters will be at the Hotel Spalding.

Following is the program:

MONDAY, DECEMBER FOURTH

Afternoon Session, 1:30 P. M.

ELKS' CLUB

1. Hypothyroidism—Dr. A. M. Snell, Mankato, Minn.
Discussion—Dr. H. S. Plummer, Rochester, Minn.; Dr. L. G. Rowntree, Rochester, Minn.; Dr. James Gilfillan, St. Paul, Minn.
2. Report of an unusual case of complete pyloric stenosis—Dr. M. H. Cremer, Red Wing, Minn.

Discussion—Dr. W. F. Heise, Winona, Minn.; Dr. F. R. Huxley, Faribault, Minn.

3. Meckel's diverticulum as an etiological factor in intestinal obstruction—Dr. J. A. Johnson, Minneapolis, Minn.
Discussion—Dr. C. H. Mayo, Rochester, Minn.; Dr. Alex R. Colvin, St. Paul, Minn.
 4. Catheter drainage through the appendix stump with water installation in diffuse peritonitis—Dr. F. S. Cooney, Princeton, Minn.
Discussion—Dr. A. U. Collins, Duluth, Minn.; Dr. R. E. Farr, Minneapolis, Minn.
 5. Surgical treatment of the tuberculous ureter—Dr. H. W. Walters, Rochester, Minn.
Discussion—Dr. Arnold Schwyzer, St. Paul, Minn.; Dr. George Eitel, Minneapolis, Minn.
 6. Experimental production of gastro-jejunal ulcers—Drs. F. C. Mann and C. S. Williamson, Rochester, Minn.
Discussion—Dr. S. Marx White, Minneapolis, Minn.; Dr. J. F. Corbett, Minneapolis, Minn.
 7. After us what, or why is the general practitioner?—Dr. J. H. Adair, Owatonna, Minn.
Discussion—Dr. Fred L. Strathern, St. Peter, Minn.; Dr. H. O. Williams, Lake Crystal, Minn.
 8. The delayed flap in the closure of post-operative openings of the palate and antrum—Dr. Gordon B. New, Rochester, Minn.
Discussion—Dr. Harry Ritchie, St. Paul, Minn.; Dr. Carl W. Waldron, Minneapolis, Minn.
 9. Discussion of Sheppard-Towner Act—Dr. C. E. Hartley, St. Paul, Minn.
Discussion—Dr. R. D. Mussey, Rochester, Minn.; Dr. H. F. Helmholtz, Rochester, Minn.
 10. Basic medical practice act—Dr. Carl B. Drake, St. Paul, Minn.
Discussion—Dr. Thomas McDavitt, St. Paul, Minn.; Dr. J. W. Andrews, Mankato, Minn.
- Business Meeting at 5:30 P. M.

BANQUET

Invocation

Music

Address of Welcome—By the Mayor of Mankato.

Music

Presidential Address—Dr. W. F. Braasch, Rochester, Minn.

MONDAY, DECEMBER FOURTH

Scientific Program

8:00 P. M.

1. Empyema—analysis of one hundred cases in relation to the treatment of this condition—Dr. Howard L. Beye, Iowa City, Iowa.
Discussion—Dr. C. A. Hedblom, Rochester, Minn.; Dr. A. C. Baker, Fergus Falls, Minn.
2. Care and feeding of premature infants—Dr. Clifford C. Grulee, Chicago, Ill.
Discussion—Dr. Henry F. Helmholtz, Rochester, Minn.; Dr. Walter Ramsey, St. Paul, Minn.

3. Dr. Arthur Steindler, Iowa City, Ia.
Discussion—Dr. Emil Geist, Minneapolis, Minn.
4. Supra-pubic prostatectomy—Dr. V. J. LaRose, Bismarck, N. D.
Discussion—Dr. V. C. Hunt, Rochester, Minn.; Dr. Warren C. Dennis, St. Paul, Minn.

TUESDAY, DECEMBER FIFTH

Morning Session, 8:30 A. M.

1. The old head injury cases, a study of 100 cases—Dr. J. C. Michael, Minneapolis, Minn.
Discussion—Dr. Archa Wilcox, Minneapolis, Minn.; Dr. A. W. Adson, Rochester, Minn.
2. Collapse therapy in the treatment of pulmonary tuberculosis—Dr. Everett K. Geer, St. Paul, Minn.
Discussion—Dr. Willis S. Lemon, Rochester, Minn.; Dr. Henry L. Ulrich, Minneapolis, Minn.
3. The clinical use and abuse of quinidine sulphate—Dr. S. Marx White, Minneapolis, Minn.
Discussion—Dr. H. Z. Giffin, Rochester, Minn.; Dr. E. L. Gardner, Minneapolis, Minn.
4. Uterine fibromyomas, complicatory pregnancy—Dr. R. D. Mussey, Rochester, Minn.
Discussion—Dr. J. C. Litzenberg, Minneapolis, Minn.
5. Obstetrics of 1,000 cases, as seen by a country practitioner—Dr. August Kuhlman, Melrose, Minn.
Discussion—Dr. W. B. Condit, Minneapolis, Minn.
6. Some things the general practitioner should know about urology—Dr. G. J. Thomas, Minneapolis, Minn.
Discussion—Dr. H. C. Bumpus, Rochester, Minn.; Dr. Fred Foley, St. Paul, Minn.
7. Remote aspects of Neisserian infection—Dr. W. H. Von Lackum, Rochester, Minn.
Discussion—Dr. Paul Cook, St. Paul, Minn.; Dr. N. H. Cline, St. Paul, Minn.
8. Stigmata of latent lues hereditary—Dr. Paul O'Leary, Rochester, Minn.
Discussion—Dr. John Butler, Minneapolis, Minn.; Dr. H. G. Irvine, Minneapolis, Minn.
9. Our medical societies, their missions and relations—Dr. W. L. Burnap, Fergus Falls, Minn.
Discussion—Dr. J. F. Corbett, Minneapolis, Minn.; Dr. C. B. Drake, St. Paul, Minn.
10. The present status of diagnostic methods in tubercular enteritis—Dr. Willis S. Lemon, Rochester, Minn.
Discussion—Dr. F. W. Wittich, Minneapolis, Minn.; Dr. H. L. Taylor, St. Paul, Minn.

Luncheon at 12:30 P. M.

ST. LOUIS COUNTY MEDICAL SOCIETY

At the annual meeting and banquet of the St. Louis County Medical Society held at the Duluth Chamber of Commerce, October 19, 1922, the following officers were elected: President, Dr. O. W. Parker, Ely; first vice president, Dr. E. L. Tuohy, Duluth; second vice president, Dr. N. D. Keane, Coleraine; secretary-treasurer, Dr. F. H. Magney, Duluth; board of censors, Dr. E. L. Cheney, Dr. William Eklund and Dr. F. J. Elias, all of Duluth. Dr. L. A. Barney of Duluth was elected delegate with Dr. E. L. Doolittle, Dr. J. Kuth, Dr. F. L. Lepak and Dr. J. R. Manley as alternates.

STEARNS-BENTON MEDICAL SOCIETY

The Stearns-Benton Medical Society held its annual meeting October 3, 1922, at Brooten. Dr. R. T. Glycer of Brooten was host at a duck dinner given to members of the society preceding the program. Covers were laid for sixty guests.

Papers were read by Dr. August Kuhlmann of Melrose, Dr. G. E. Sherwood of Kimball, Dr. C. B. Lewis and Dr. C. F. Brigham, both of St. Cloud.

SOUTHWESTERN MINNESOTA MEDICAL ASSOCIATION

The semi-annual meeting of the Southwestern Minnesota Medical Association was held October 26, 1922, at Windom with a good attendance.

The program included the president's address, delivered by Dr. B. O. Mork of Worthington, a conference on "County Nurses' Work," to which papers were contributed by Miss Eva McKeown of Pipestone and Miss Dorothy Motl of Jackson, presentation of clinical cases, and two papers, "Nephritis," by Dr. L. G. Rowntree of Rochester, and "The Field of Cardiac Response," by Dr. J. T. Smallwood of Worthington.

At the business session following the program the following officers were elected for the ensuing year: President, Dr. F. W. Metcalf, Fulda; vice president, Dr. Thomas A. Lowe, Slayton; secretary-treasurer, Dr. William A. Piper, Mountain Lake; censors, Dr. L. A. Williams, Slayton, and Dr. F. R. Weiser, Windom.

The proposed Basic Medical Practice Act as outlined by the Committee on Public Policy and Legislation of the state association was approved by the society.

CLINICAL ORTHOPEDIC SOCIETY

The annual meeting of the Clinical Orthopedic Society, formerly known as the Central States Orthopedic Club, will be held Friday and Saturday, December 15 and 16. The sessions of the first day will take place in Rochester with the meeting of the second day in the Twin Cities.

TEN WAYS TO KILL A MEDICAL SOCIETY

Don't go to the meetings.
If you do go, go late.
If the weather doesn't suit you, don't think of going.
If you do attend a meeting, find fault with the work of the officers and members.
Never accept office, as it is easier to criticize than to do things.

Get sore if you are not appointed on committees, but if you are do not attend committee meetings.

If asked by the chairman to give your opinion on some matter, tell him you have nothing to say. After the meeting tell everyone how things should be done.

Do nothing more than absolutely necessary, but when members use their ability to help matters along, howl that the institution is run by a clique.

Hold back your dues, or don't pay at all.

Don't bother about getting new members. "Let George do it."—*Pittsburgh Medical Journal*.

OF GENERAL INTEREST

Dr. E. J. Hynes, formerly of Soudan, is now in Chicago taking postgraduate work in medicine.

Dr. Frank Spicer of Duluth attended the Tri-State Medical meeting at Peoria, Illinois, in October.

Word has been received of the birth of a daughter to Dr. and Mrs. W. H. Darling of Minneapolis, on October 3.

Dr. T. F. Rodwell of Mahanomen was recently appointed government physician for the White Earth Indian Reservation.

Dr. B. J. Branton of the Willmar Clinic attended the meeting of the American College of Surgeons in Boston in October.

Dr. W. L. Palmer of Albert Lea has purchased a site for a medical building which he contemplates erecting in the early spring.

Dr. Robert Emmett Farr of Minneapolis read a paper before the Manitoba Medical Association at Winnipeg on November 16, 1922.

Dr. and Mrs. Ole Neseth, formerly of Decatur, Illinois, are now located at Kenyon, Minnesota, where Dr. Neseth will practice medicine.

Dr. and Mrs. Reuben A. Johnson of Minneapolis sailed in October for Europe, where Dr. Johnson will continue his studies in medicine.

Dr. Hazel Boness has recently returned from a five-years' stay in Europe and is now the guest of her sister, Mrs. W. A. Caine of Stillwater.

Dr. R. Gilmore of Bemidji, who has been confined to his bed on account of illness for several weeks, has recovered and is able to resume his practice.

Dr. and Mrs. O. T. Sherping of Fergus Falls have returned from a trip to Boston, where Dr. Sherping attended the Surgeons' Congress in October.

Dr. M. George Milan of Thief River Falls has returned from a month's stay in Boston and New York, where he spent a brief period in studying.

Dr. J. A. McCuen of Duluth, who has been under treatment at St. Luke's Hospital, has been reported as improving rapidly and is now convalescing at home.

Dr. A. J. O'Leary, who has practiced at Eveleth for the past three years, is now associated with Dr. R. L. Burns in the management of the Soudan hospital.

Dr. W. A. Fansler of Minneapolis was recently elected archon, or national head, of Phi Beta Pi medical fraternity at the national convention held in Chicago.

Dr. Walfred Johnson has severed his connections with St. Mary's hospital in St. Paul and has become associated in his practice with Dr. D. Kalinoff of Stillwater.

Announcement has been received of the marriage of Dr. Harry E. Bank of Minneapolis and Miss Marion Margaret Emery of Anoka, which took place in Minneapolis, October 14.

Dr. Richard O. Leavenworth has announced the opening of his office at 741 Lowry Building, St. Paul, for the practice of his specialty, diseases of the eye, ear, nose and throat.

Dr. and Mrs. C. S. Bigelow, of Two Harbors, Minnesota, are visiting in Detroit, Michigan, and other eastern points prior to leaving for Florida, where they will spend the winter.

Dr. John H. Rishmiller, chief surgeon of the Soo railroad, was elected president of the American Association of Railway Surgeons at their annual convention in Chicago which was held in October.

Dr. C. F. Tuomy, formerly of St. Peter, Minnesota, who has been conducting a private hospital in Genesee, Idaho, recently has moved to Los Angeles, California, where he will establish his practice.

Dr. T. H. Dedolph, who practiced in Braham for four years previous to the war, has returned to his former field of practice and will be associated in his professional work with Dr. Charles Swenson.

Dr. and Mrs. E. P. Hawkins of Montrose were guests of honor at a public gathering of the citizens of Montrose, October 19, in celebration of the twenty-first anniversary of their arrival in that city.

Dr. O. C. Breitenbach, formerly of Frazee, Minnesota, has recently returned from Berlin and Paris, where he spent six months in taking post-graduate work. Dr. Breitenbach is now located in Columbus, Indiana.

Dr. James McAuliffe of Duluth is in a hospital at Deer River as a consequence of a paralytic stroke which he suffered the first of November on returning from a hunting trip in the northern part of the state.

Dr. Arthur T. Farisy of Chicago has recently moved to Fairfax, Minnesota, where he has taken over the practice of Dr. G. H. Walker. Dr. Walker will devote his time to practicing his specialty in eye, ear, nose and throat diseases.

Dr. B. D. Good, formerly of Biwabik, who for the past season has been at the Nopeming Sanatorium, left last month for Colorado Springs, Colorado, where he will be connected with the Cragmor Sanatorium, a private institution.

The annual card party of the Ladies' Auxiliary of the St. Louis County Medical Society was held at the Kitchi Gammi Club Tuesday, October 24. Proceeds of the party, at which fifty tables of bridge were played, are to be used for charitable purposes.

Dr. W. J. Cochrane has established his practice at Lake City in partnership with Dr. Harry E. Bowers, under the name of Cochrane and Bowers. Dr. Cochrane, who comes to his new work from Monticello, Iowa, practiced in Lake City several years ago.

Dr. J. C. Michael of Minneapolis resigned his position as chief Neuro-Psychiatrist for District 10 of the government service December first. Dr. Michael's activities were concerned with welfare and rehabilitation work among the ex-service men of Minnesota, North Dakota, South Dakota and Montana.

The charter of the Carlton County Medical Society was rescinded at the request of members by the Council at the annual meeting of the State Association in October. Former members of the Carlton County Society will become affiliated with the St. Louis County Society, which through this union now embraces St. Louis, Cook, Lake and Carlton counties.

Dr. C. L. Scofield of Benson was re-elected president of the Minnesota Public Health Association at the annual meeting held in St. Paul last month. Other officers named include Dr. E. P. Lyons, dean of the medical school, University of Minnesota, first vice president; Dr. A. J. Chesley, of the State Board of Health, second vice president; Dr. A. J. Stowe, Rush City, secretary, and Dr. W. A. Laidlaw, St. Paul, treasurer.

Plans are well under way for the convention of Nu Sigma Nu fraternity to be held December 1 and 2 in the Twin Cities. Alumni members are being urged especially to set aside these two days for attendance at the meetings which will open at 10 A. M. Friday morning at the Curtis Hotel in Minneapolis. The program as outlined includes, besides the regular business sessions, entertainment in the form of a sight-seeing tour of Minneapolis, a smoker and model initiation at the Minnesota Club, St. Paul. Saturday, December 2, Dr. Charles F. Hoover of Cleveland will address members following the convention banquet which will be given at 7:00 P. M. at the Curtis Hotel. An added feature of entertainment following the regular convention days will be a trip to the Mayo Clinic by special train Sunday afternoon, where the alumni of Rochester will entertain convention visitors over Monday. Dr. C. N. McCloud of St. Paul is convention representative of that city. Ralph H. Creighton, of the active chapter of Nu Sigma Nu at the University of Minnesota, is chairman of the convention committee.

The United States Veterans' Bureau is offering a special course in Neuro-Psychiatry to a certain number of qualified physicians on condition that upon completion of such course they will continue in the service of the Bureau for a period of at least two years thereafter.

The policy of this Bureau is to provide expert medical attention for the disabled veterans so that everything possible may be done to restore them to health and proper status in civilian life. To maintain this policy in the opening up of new hospitals, and being unable to secure the required number of specialists in nervous and mental disease, it has become necessary to instruct a staff of their own for this line of work. To this end a systematic and comprehensive course in Neuro-Psychiatry has been carefully outlined consisting of 176 lectures and demonstrations and some 440 hours of clinical and laboratory work. Each course will be for a period of about four months. There will probably not be more than two courses annually. Instruction will include the necessary reviews of the fundamentals, followed by clinics and lectures on the various forms of nervous and mental diseases, including endocrinology. Special attention will be devoted to diagnostic methods, the general care of patients, and methods of treatment. Students will have actual experience in practical work. General problems of hospital administration, medico-legal questions, rehabilitation methods, psycho-metric examinations and other related matters will be adequately dealt with.

The main part of this course will be given at St. Elizabeth's Hospital, a government institution for the insane at Washington, D. C., which offers unusual and unexcelled facilities for such work. There are nearly 4,000 patients and case histories of more than 20,000 discharged patients immediately available for study. Here are all classes of

nervous and psychotic diseases, while other public hospitals in Washington will provide abundant clinics in so-called functional diseases, borderline cases, and the milder types.

The teaching staff that has been selected to give this course in Neuro-Psychiatry is significant. Besides the members of the staff at St. Elizabeth's there will be lecturers from the Medical Departments of the Army, the Navy, the Public Health Service, the United States Veterans' Bureau and the U. S. Department of Agriculture. A number of America's most eminent neurologists and psychiatrists will come to deliver lectures on special topics.

As the number of students that can be accommodated is limited, early application for each course is desirable.

The list of special lecturers include many well known members of the medical profession of Boston, New York, Baltimore, Washington, and Philadelphia.

Applications should be made to the Director of the Veterans' Bureau, Medical Division, Washington, D. C.

CORRECTION

Under the heading of General Interest in the November issue an error was made in regard to the item concerning Dr. H. C. Anderson. This should be corrected to read—Dr. H. C. Anderson of St. Paul is now engaged in practice at Big Falls, Minnesota.

NEW AND NON-OFFICIAL REMEDIES

During August and September the following articles were accepted by the Council on Pharmacy and Chemistry for inclusion in New and Non-official Remedies:

H. K. MULFORD COMPANY:

Mercurialized Serum No. 2-Mulford.

Mercuric Succinimide Hypodermic Tablets No. 50.

PARKE, DAVIS & CO.:

Adrenalin and Cocaine Tablets Rx B.

Adrenalin Tablets No. 2.

Brometone Capsules, 5 grains.

Tuberculin (old) and Control for the Von Pirquet Test.

Tuberculin Ointment for the Moro Test.

H. A. METZ LABORATORIES:

Novocain and L-Suprarenin Tablets "H."

Novocain Solution, 1 per cent.

Novocain Base.

Novocain Nitrate.

Pyramidon Tablets.

UNITED STATES RADIUM CORPORATION:

Ampules Radium Chloride 2 c.c.-U. S. Radium Corp.
(Radium element, 5 micrograms).

Ampules Radium Chloride 2 c.c.-U. S. Radium Corp.
(Radium element, 10 micrograms).

Ampules Radium Chloride 2 c.c.-U. S. Radium Corp.
(Radium element, 25 micrograms).

WINTHROP CHEMICAL CO.:

Fereo-Sajodin.

During October the following articles have been accepted:

LEDERLE ANTITOXIN LABORATORIES:

Diphtheria Toxin-Antitoxin (0.1L+)

H. A. METZ LABORATORIES, INC.:

Alumnol.

H. K. MULFORD COMPANY:

Hay Fever Timothy Pollen Extract-Mulford.

PARKE, DAVIS AND COMPANY:

Normal Horse Serum-P. D. & Co.

Rabies Vaccine (Cumming)-P. D. & Co.

E. R. SQUIBB AND SONS:

Acne Vaccine.

Colon Vaccine-Squibb.

Gonococcus Vaccine.

Meningococcus Vaccine.

Normal Horse Serum.

Pertussis Vaccine, Curative.

Pertussis Vaccine, Immunizing.

Purified Diphtheria Antitoxin (Anti-diphtheric Globulin)

Pneumococcus Vaccine.

Staphylococcus Vaccine.

Staphylo-Acne Vaccine.

Streptococcus Vaccine.

Tetanus Antitoxin Purified.

Typhoid Vaccine.

Typhoid Vaccine Combined, Immunizing.

NEW AND NON-OFFICIAL REMEDIES

Adrenalin Tablets No. 2.—Each contains adrenalin (see New and Non-official Remedies, 1922, p. 109), 0.00033 gm. (1/200 grain), as borate, yielding a 1:1000 solution when dissolved in 5 minims of water. Parke, Davis & Co., Detroit.

Hypodermic Tablets Adrenalin and Cocain Rx B. (Cylindrical).—Each contains cocaine hydrochloride, 0.005 gm. (1/12 grain) and adrenalin (see New and Non-official Remedies, 1922 p. 109), 0.00005 gm. (1/1200 grain). Parke, Davis & Co., Detroit.

Brometone Capsules, 5 grains.—Each capsule contains brometone (see New and Non-official Remedies, 1922, p. 75), 5 grains. Parke, Davis & Co., Detroit.

Corpus Luteum-G. W. C. Co.—The fresh substance from the corpora lutea of the hog, dried, freed from fat, and powdered. For a discussion of the actions and uses of corpus luteum, see New and Non-official Remedies, 1922, p. 208, under "Ovary." The product is also marketed in the form of tablets Corpus Luteum, G. W. C. Co., 2 grains. G. W. Carnick Co., New York.

Epinephrin-Lederle.—A brand of epinephrin-N. N. R. made from the suprarenal glands. For the actions, uses and dosage of epinephrin, see New and Non-official Remedies, 1922, p. 108. Epinephrin-Lederle is sold in the form of Solution Epinephrin-Lederle, containing epinephrine sulphite equivalent to 1 part of epinephrin in 1,000 parts of physiological solution of sodium chloride, preserved by a small quantity of sulphurous acid and saturated with carbon dioxide. Lederle Antitoxin Laboratories, New York.

Hypodermic Tablets No. 50—Mercuric Succinimide-Mulford, 0.012 gm. (1/5 grain), contains mercuric succini-

imide (see New and Non-official Remedies, 1922, p. 194) 0.012 gm. (1/5 grain). H. K. Mulford Co., Philadelphia.

Mecurialized Serum No. 2-Mulford.—For Intraspinal Use. Each package contains the equivalent of 0.0026 gm. (1/25 grain) of mercuric chloride in 30 c.c. of horse serum. For a discussion of the actions, uses and dosage of mercurialized serum see New and Non-official Remedies, 1922, p. 189. H. K. Mulford Co., Philadelphia.

Tuberculin (Old) and Control for the Pirquet Test.—A preparation of tuberculin-Koch (see New and Non-official Remedies, 1922, p. 293) marketed in packages containing three sealed glass tubes of tuberculin, each tube containing tuberculin sufficient for one test and three tubes of control material. Parke, Davis & Co.

Tuberculin Ointment for the Moro Test.—A preparation of tuberculin-Koch (see New and Non-official Remedies, 1922, p. 293) marketed in collapsible tubes containing 2 gm. of an ointment consisting of 50 per cent of tuberculin-Koch and 50 per cent of anhydrous wool-fat. Parke, Davis & Co., Detroit. (Jour. A. M. A., Sept. 9, 1922, p. 897.)

Pyramidon Tablets, 5 grains.—Each tablet contains pyramidon (see New and Non-official Remedies, 1922, p. 251), 5 grains. H. A. Metz Laboratories, Inc., New York.

Novocain Solution 1 Per Cent Ampules.—Each contains novocain, 0.06 gm. (1 grain), sodium chloride, 0.036 gm. (½ grain), and distilled water, 6 c.c. (90 minims). H. A. Metz Laboratories, New York.

Ampulus Radium Chloride, 2 c.c.—United States Radium Corp. (Radium element, 5 micrograms). For a discussion of the actions, uses and dosage of radium, see New and Non-official Remedies, 1922, p. 252, United States Radium Corporation (formerly Radio Chemical Corp.) New York (see New and Non-official Remedies, 1922, p. 261.)

Ampules Radium Chloride, 2 c.c.—United States Radium Corp. (Radium element, 10 micrograms). Radium Chemical Corporation, New York.

Ampules Radium Chloride, 2 c.c.—United States Radium Corp. (Radium element, 25 micrograms). United States Radium Corporation, New York. (Jour. A. M. A., Sept. 23, 1922, p. 1049.)

Ferro-Sajodin-Ferrioben.—Ferro-sajodin is a basic ferric iodobenenate, containing at least 5 per cent of iron and at least 24 per cent of iodine. It has the actions of iodides and iron but is claimed to be more stable and palatable than ferrous iodide, not to injure the teeth or to disturb the gastro-intestinal tract and that it is free from a constipating tendency. It is claimed that ferro-sajodin is easily absorbed but slowly eliminated, thus insuring a more prolonged effect than that obtained from inorganic iodides and iron compounds. Ferro-sajodin is indicated in conditions in which iron and iodides are employed, such as anemia, rickets, syphilis, chronic bronchitis and arteriosclerosis with anemia. Ferro-sajodin is marketed only in the form of Ferro-sajodin tablets, 8 grains. Winthrop Chemical Co., Inc., New York. (Jour. A. M. A., Sept. 30, 1922, p. 1136.)

Novocain and L-Suprarenin Tablets "H".—Each tablet contains novocain 0.06 gm. (1 grain) and 1 suprarenin

synthetic 0.00006 gm. (1/1000 grain). For a discussion of the actions, uses and dosage of procaine, see New and Non-official Remedies, 1922, p. 36. H. A. Metz Laboratories, 1049.)

Hayfever Timothy Pollen Extract-Mulford.—The liquid is obtained by extracting the proteins from the pollen of timothy. For a discussion of actions, uses and dosage, see the article on Pollen and Epidermal Extracts, Preparations and Biologically Reactive Food Proteins, New and Non-official Remedies, 1922, p. 232. This preparation is marketed in packages containing fifteen consecutive doses for a complete treatment and also in packages containing partial treatments only. H. K. Mulford Co., Philadelphia.

Purified Diphtheria Antitoxin (Antidiphtheric Globulin).—Concentrated diphtheria antitoxin (New and Non-official Remedies, 1922, p. 280) is marketed in syringe containers of 1,000 units and in syringe containers of, respectively, 3,000, 5,000, 10,000 and 20,000 units. E. R. Squibb and Sons, New York.

Normal Horse Serum.—This product (New and Non-official Remedies, 1922, p. 278) is also marketed in packages of one 10 c.c. syringe. E. R. Squibb & Sons, New York. (Jour. A. M. A., Oct. 21, 1922, p. 1427.)

Aluminum Compounds.—Several aluminum compounds are official, including the ordinary alum. The acetate and acetotartrate of aluminum are used in the form of solutions described in the National Formulary. Aluminum compounds are used for their astringent action. They are not so astringent as the lead salts, but they may exert an irritant and even caustic action when used in the form of concentrated solutions or as "burnt" alum. Aluminum compounds are slightly antiseptic. Proprietary preparations of aluminum in combination with organic acids have been introduced with a view of utilizing the astringent and antiseptic properties of their components.

Alumol.—The aluminum salt of betanaphthol-disulphonic acid. Alumol is used as a mild antiseptic and, in concentrated solutions, as an irritant or caustic. It is used for the destruction of the gonococcus in gonorrhea. H. A. Metz Laboratories, Inc., New York.

Novocain Base.—Para-amino-benzoxymethylamino-ethane. The base contained in procaine. The action and uses of novocain base are the same as those of procaine (New and Non-official Remedies, 1922, p. 36), but it is soluble in fixed oils. H. A. Metz Laboratories, Inc., New York.

Novocain Nitrate.—A brand of procaine nitrate. N. N. R. (New and Non-official Remedies, 1922, p. 37). It has the actions and uses of procaine, but is compatible with silver salts. H. A. Metz Laboratories, Inc., New York.

Diphtheria Toxin-Antitoxin Mixture (0.1L+).—A diphtheria toxin-antitoxin mixture (New and Non-official Remedies, 1922, p. 282) containing 0.1 lethal dose of diphtheria toxin neutralized with the required amount of diphtheria antitoxin. Marketed in packages of three vials, each containing 1 c.c.; also in packages of thirty vials, each containing 1 c.c. Lederle Antitoxin Laboratories, New York.

Acne Vaccine.—Acne bacillus vaccine (New and Non-official Remedies, 1922, p. 298) is marketed in packages of

four syringes containing respectively 50, 100, 250 and 500 million killed bacilli; in packages of four ampules containing, respectively, 50, 100, 250 and 500 million killed bacilli (with a syringe); in vials of 5 c.c., 10 c.c. and 20 c.c., each cubic centimeter containing 1,000 million killed bacilli. E. R. Squibb and Sons, New York.

Gonococcus Vaccine.—This product (New and Non-official Remedies, 1922, p. 301) is marketed in packages of four syringes containing, respectively, 100, 250, 500 and 1,000 million killed gonococci; in packages of four ampules containing, respectively, 100, 250, 500 and 1,000 million killed gonococci (with a syringe); in vials of 5 c.c., 10 c.c., and 20 c.c., each cubic centimeter containing 1,000 million killed gonococci. E. R. Squibb and Sons, New York.

Meningococcus Vaccine, Curative.—Meningococcus vaccine (New and Non-official Remedies, 1922, p. 302) is marketed in packages of four syringes containing, respectively, 100, 250, 500 and 1,000 million killed meningococci; in packages of four ampules containing, respectively, 100, 250, 500 and 1,000 million killed meningococci (with a syringe); and in vials of 5 c.c., 10 c.c. and 20 c.c., each cubic centimeter containing 1,000 million killed meningococci. E. R. Squibb and Sons, New York.

Pertussis Vaccine, Curative.—Pertussis bacillus vaccine (New and Non-official Remedies, 1922, p. 303) is marketed in packages of four syringes containing, respectively, 100, 250, 500 and 1,000 million killed bacilli; in packages of four ampules containing, respectively, 100, 250, 500 and 1,000 million killed bacilli (with syringe); and in vials of 5 c.c., 10 c.c. and 20 c.c., each cubic centimeter containing 2,000 million killed bacilli. E. R. Squibb and Sons, New York.

Pertussis Vaccine, Immunizing.—Pertussis bacillus vaccine (New and Non-official Remedies, 1922, p. 303) is marketed in packages of three syringes containing, respectively, 500, 1,000 and 1,000 million killed bacilli; in packages of three ampules containing, respectively, 500, 1,000 and 1,000 million killed bacilli (with a syringe). E. R. Squibb and Sons, New York.

Pneumococcus Vaccine.—This product (New and Non-official Remedies, 1922, p. 304) is a suspension of killed pneumococci, Types I, II, III and Group IV, in equal proportions. Marketed in packages of four syringes containing, respectively, 100, 250, 500 and 1,000 million killed pneumococci; in packages of four ampules containing, respectively, 100, 250, 500 and 1,000 million killed pneumococci (with syringe); and in vials of 5 c.c., 10 c.c. and 20 c.c., each cubic centimeter containing 5,000 million killed pneumococci. E. R. Squibb and Sons, New York. (Jour. A. M. A., Oct. 28, 1922, p. 1519.)

PROPAGANDA FOR REFORM

A Pancreatic Hormone in Diabetes.—Since the discovery of the important rôle of the pancreas in carbohydrate metabolism in the body there have been many attempts to supply the missing "regulator" of sugar combustion and attention has naturally been centered on the pancreas in this connection. Significant results have been secured in the Department of Physiology at the University of Toronto

by J. J. R. Macleod and his collaborators. An alcoholic extract of pancreas has been prepared which apparently enabled the diabetic animal and man to metabolize sugar better. The investigators are wisely withholding the product from general use until its value is definitely established. (Jour. A. M. A., Oct. 21, 1922, p. 1428.)

Typhoid Vaccination by Mouth.—Besredka has proposed vaccination against typhoid by mouth. His vaccine consists of a pill of bile and a tablet containing a mixture of heat-killed typhoid and paratyphoid bacilli. These are taken three mornings in succession. It is for the future to determine whether or not the method has value. (Jour. A. M. A., Oct. 21, 1922, p. 1446.)

The Reactions of Boston to the "Reactions" of Abrams.—Abrams gave a clinical demonstration of his methods in the laboratory of one of his disciples in Boston. Abrams refused to submit the method, it is said, to any test offered, but confined himself to demonstrating the presence of lesions the existence of which could be proved only by post-mortem examination. A member of the staff of the Boston Medical and Surgical Journal, a man in perfect health, was selected for experiment. By his diagnostic methods Abrams discovered in this healthy individual a streptococcus infection, tuberculosis of the intestinal tract, congenital syphilis and intestinal sarcoma. Otherwise the man was all right. It is understood that the volunteer inconsiderately refused to submit to a post-mortem examination. (Jour. A. M. A., Oct. 28, 1922, p. 1524.)

BOOK REVIEWS

BOOKS RECEIVED FOR REVIEW

THE LAW OF VITAL TRANSFUSION AND THE PHENOMENON OF CONSCIOUSNESS. Charles J. Reed. 74 pages. Occidental Publishing Company, San Francisco, 1921.

CLINICAL MEDICINE—TUESDAY CLINICS AT THE JOHNS HOPKINS HOSPITAL. Lewellys F. Barker, M.D., LL.D., Professor of Medicine Emeritus, Johns Hopkins University; Visiting Physician to Johns Hopkins Hospital, Baltimore. 617 pages. Illustrated. Philadelphia and London: W. B. Saunders Co., 1922. Cloth, \$7.00 net.

DISEASES OF WOMEN. Harry Sturgeon Crossen, M.D., F.A.C.S., Clinical Professor of Gynecology, Washington University Medical School, and Gynecologist in Chief to the Barnes Hospital and the Washington University Dispensary. 1005 pages. Illustrated. St. Louis: C. V. Mosby Co., 1922. Cloth, \$10.00.

THE FEMALE IMPERSONATORS. Werther-June. 295 pages. Illustrated. Edited with introduction by Alfred W. Herzog, Ph.B., A.M., M.D., Member of New York and New Jersey Bar. Editor Medico-Legal Journal. New York: New York Medico-Legal Journal Printing Co., 1922. Cloth, \$3.00.

PHYSIOLOGY AND BIOCHEMISTRY IN MODERN MEDICINE. J. J. R. McLeod, M.B., Professor of Physiology, University of Toronto, Canada; formerly Professor of Physiology, Western Reserve University, Cleveland. 992 pages. 243 illustrations. 9 color plates. St. Louis: C. V. Mosby Co., 1922. Cloth, \$11.00.

ELEMENTS OF SCIENTIFIC PSYCHOLOGY. Knight Dunlap. Professor of Experimental Psychology in Johns Hopkins University, Baltimore; author of "Mysticism, Freudianism and Scientific Psychology." 368 pages. 31 illustrations. St. Louis: C. V. Mosby Co., 1922. Cloth, \$3.50.

PHYSICAL DIAGNOSIS. W. D. Rose, M.D., Lecturer on Physical Diagnosis and Associate Professor of Medicine, University of Arkansas; Visiting Physician, Little Rock City Hospital, Baptist Hospital and St. Vincent's Infirmary, Little Rock, Ark. 3rd edition. 755 pages. 319 illustrations. St. Louis: C. V. Mosby Co., 1922. Cloth, \$8.50.

DISEASES OF THE SKIN. By Richard L. Sutton. Fourth Edition. Pp. 1132. With 969 illustrations in black and white and 11 illustrations in colors. St. Louis: The C. V. Mosby Company. 1921.

The new fourth edition of Sutton's work is better than the third edition, is larger and has more illustrations. The pictures are, to my mind, the most striking feature of the work. In fact, considering the value of the book to a student or general practitioner, the illustrations add immensely to the interest as well as clarify the diagnosis and the external pathology as given by the author.

The chapters on syphilis are to be commended. The text is clear and concise and the illustrations aid in giving the reader a very good picture of the protean manifestations of syphilis of the skin.

Altogether a book worth while.

E. C. GAGER.

LOCATIONS

WANTED: Position as office assistant to good surgeon in St. Paul by graduate registered nurse with post-graduate course. Regular hours more of object than compensation. Address MINNESOTA MEDICINE, B-44.

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WANTED—House Physician wanted for Institution specializing in Rheumatism, 20 miles south of Twin Cities. Excellent opportunity for right man. For particulars and salary apply Mudcura Sanitarium, Shakopee, Minnesota.

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